

AN APPRAISAL METHOD FOR MEASURING
THE QUALITY OF HOUSING: A Yardstick
for Health Officers, Housing Officials and Planners

Part II. Appraisal of Dwelling Conditions

Volume A. Survey Director's Manual

AMERICAN PUBLIC HEALTH ASSOCIATION
COMMITTEE ON THE HYGIENE OF HOUSING

1790 Broadway • New York 19, New York

1946

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COMMITTEE ON THE HYGIENE OF HOUSING
PRINTED IN THE UNITED STATES OF AMERICA

First Edition

An Appraisal Method for Measuring the Quality of Housing
A CONTRIBUTION OF THE SUBCOMMITTEE ON APPRAISAL
OF RESIDENTIAL AREAS

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FOREWORD

Broad purposes to be served by a housing survey under this appraisal technique have been considered in Part I of this publication, "Nature and Uses of the Method." The present volume assumes the reader to be familiar with that monograph, and tells how a dwelling survey appropriate to local needs can be planned and carried out. It is addressed primarily to the person in direct charge of this undertaking, and the Health Officer, Housing Authority Director, or other principal of a sponsoring agency need not study it unless he plans to assume such responsibility.

It is hoped, however, that parts of this manual may be of interest to those among survey sponsors (or other critical readers) whose curiosity as to the technique has been aroused but not satisfied by Part I. Many of their questions are answered here in Chapter II, which explains the rating system more fully, including the method of scale-construction and validation. That chapter also explains each item of the appraisal in terms of its purpose, content and range of scores. Special emphasis is given to the reasoning behind items of a new type, such as those on overcrowding, structural deterioration and daylight obstruction. Sections in later chapters describe the primary materials specially developed for this appraisal method, including the scoring templates, appraisal form and percentage scaling device for marginal punch cards.

The manual is based on the premise that consulting service will be rendered locally, before active survey operations begin, by a staff member of the Committee on the Hygiene of Housing. The need for this has been explained in the first appendix of Part I, and content of the service is further set forth in chapters of the present volume.

These chapters have a dual purpose in relation to the consultant's service. By reading them in advance of the consulting period, the survey director will understand in a general way the basic operations and materials to be used, the schemes of rating and analysis, and numerous alternatives in operating practice. This understanding will facilitate decisions to be made with the consultant. On the basis of such reading, various administrative preparations can be made before the consulting period, and Appendix A supplies data for this purpose.

After the consultant's departure the text will guide the director in day-by-day supervision of his staff through all phases of the study.

Appendices B and C, bound separately and containing full instructions for each operation performed by field and office personnel, may be disregarded until the consulting period. At that time they will be used to train inspectors and clerks. Operations are more rapidly performed than might be supposed from the detail of written instructions provided for them. Most steps in the work are simple and highly routinized; clerks and inspectors soon learn the basic operations and function with only occasional reference to the written procedures.

A physical difference between the present manual and that for the environmental

FOREWORD

appraisal (Part III) is worthy of note. Whereas the environmental manual combines in one volume both the materials for guidance of the survey director and the detailed instructions for his staff, the director's manual for the dwelling survey is bound separately from the field and office procedures. This is done because the dwelling survey uses separate field and office crews, who can thus be supplied economically with individual copies of detailed instructions for their work.

These manuals treat of an appraisal project as a survey in the usual sense: an undertaking with a definite completion date. It is recognized that health departments or other sponsoring agencies may desire to continue the work indefinitely, maintaining a continuous inventory of local housing conditions. This practice is encouraged by the Committee as a desirable part of municipal administration. The procedures set forth here are generally adapted to such continuing work merely by regarding a given survey area—or the work in a given period of time—as a subdivision of an indefinitely continuing task.

A welcome duty on behalf of the Committee has been the final one of recalling to mind the agencies and individuals who have given technical help in shaping the content of these procedures or have cooperated in their testing. The roster is long and diversified, and acknowledgments are given following Chapter VI.

At this point, however, is owed a special acknowledgment of the notable contribution made by the Committee's Technical Secretary, Allan A. Twichell. Under the inspiration of Chairman Winslow, he formulated the attack on problems of housing evaluation prior to the creation of a subcommittee in this field. He and the Committee's staff have devoted their major effort for several years to the development, testing and integration of workable procedures. Although members of the subcommittee have given substantial assistance at all stages of the development, credit for the total result belongs primarily to Mr. Twichell. His sound judgment and untiring efforts have been central to the production of what the Committee believes will be accepted as a major contribution alike in the fields of housing, city planning, and public health administration.

ROLLO H. BRITTEN, *Chairman*
Subcommittee on Appraisal of Residential Areas

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Chapter I

ORGANIZATION OF THE DWELLING SURVEY

A dwelling appraisal consists of four series of operations: collecting the information, processing it, analysis, and effectuation of the findings. Each of these phases is the subject of a later chapter, which explains the work and materials used and points out special responsibilities of the director. Exact instructions to field and office staffs are given in the appendices. As noted in the Foreword, those instructions may be disregarded until arrival of the Committee's consultant.

The present chapter is designed to assist the survey director in planning a study which will move smoothly from start to finish. Considered in the sections below are such controlling factors as defining the purposes and scope of the study, personnel selection and size of staff, preliminary budgets, the nature of services to be rendered by the consultant, and administrative preparations to be made in advance of his arrival.

1. Matters of Sponsors' Policy

A first responsibility of the director is to make sure that the sponsors know what they want. He should also see that his principals understand the task being undertaken—not in detail but sufficiently to appreciate the director's problems and to support his decisions as the work proceeds.

Discussed in this section are fundamentals of policy on which the sponsors will perhaps have reached tentative conclusions as the result of having read Part I. If these points have not been considered prior to selection of the director, he should make it his duty to raise the questions set forth below and to press for decisions needed.

Even if tentative decisions have been reached, the director may challenge some of them after reading this and later chapters. In this case he should reopen such questions as he sees fit.

AUSPICES

Should and can the sponsorship of the proposed study be broadened to include other local groups than the body initially interested? This is perhaps the most basic question of all, and an initiating agency should canvass

the possibilities as a first step. Inclusion of other sponsors will not only enlarge the resources available, but may broaden the purposes and perhaps alter the content or emphasis of the study. It is cheaper to know these possibilities in advance than to adjust partly made plans to them.

In addition to official agencies which might be enlisted as cosponsors, consideration might be given to the following types of bodies: a council of social agencies, a chamber of commerce or real estate board, an unofficial housing association, a central labor council, and university departments of sociology, government, architecture or city planning. Others appropriate to the local situation may suggest themselves. Sponsorship should not be so broad as to become unwieldy, but additional sponsors may be a source of strength for a study—either through contribution of personnel or funds or because they will be able to help in carrying the findings to the public.

PURPOSE

Is the study intended chiefly as a basis for broad planning and housing policy, as illustrated in Part I, or is it desired to couple the appraisal with regular enforcement programs of official agencies which have to do with specific properties? The latter course may be the normal and desirable one for studies sponsored by enforcement agencies, but this option should not be chosen without regard to the added cost of covering a given area. A dual-purpose study will usually require inspection of every dwelling, rather than sampling. Inspection for violations of local ordinances may also increase the inspection time per dwelling considerably beyond the figures given in Part I, which were for broad surveys divorced from regular inspection and enforcement work. The director will be able to make preliminary time and cost estimates based on either option, as explained in Section 3 of this chapter.

AREAS TO BE STUDIED

Is it intended that all of the generally recognized problem areas in the community shall be evaluated, or are selected areas only to be covered? Can the sponsors

ORGANIZATION OF THE DWELLING SURVEY

designate specific areas and a priority or desired sequence of study for these areas? A definite statement as to why they have been chosen is desirable, both because it may develop a clarifying discussion among the sponsors and because it will give the director and consultant a clear basis for their detailed planning.

Findings of the 1940 Housing Census, a Real Property Inventory, or other previous study should be used if possible as a general check on areas recommended by the sponsors. Areas selected with reference to such data can be used as a basis for cost estimates, perhaps making some allowance for enlargement of these areas as the study proceeds. It may be well to designate marginal zones or buffer strips around the areas of primary interest, to be included or excluded as findings of the study may suggest or resources may permit.

Where objective data from earlier studies are not available as the basis for area selection, considerable allowance should be made for later adjustment in the light of survey findings. Such allowance might take the form of designating rather wide marginal zones and a generous contingency reserve in the budget.

If the study areas were not originally selected in terms of Census tracts or some other officially accepted scheme of districting, it may be desirable to adjust the boundaries so as to coincide with those of a recognized official scheme. This will assure comparability of findings with results of other studies, and should promote wider usefulness of the data. Such adjustment should not, of course, be arbitrarily carried to the point where it interferes with the purposes intended or needlessly changes the scale of operations.

RELATION TO ENVIRONMENTAL SURVEY

Is it desired to make the combined appraisal of dwelling and environmental conditions, or is only one of these surveys wanted? Both are of course desirable, but local circumstances may sometimes warrant doing either one alone. If the sponsoring group does not include a city planning body, it will usually be difficult to make the environmental study economically and it would ordinarily be wise to conduct a dwelling survey only.

SAMPLING OR COMPLETE ENUMERATION

Shall all dwellings be inspected, or sample dwellings only? In a sampling study, a specified percentage of units will be selected from each principal type of dwelling structure—commonly one-family, two-family, and large and small multiple dwellings. Selection is made at random from these classifications, in the office, from maps or dwelling lists, using methods which avoid bias in selection.

If anyone among the sponsors distrusts the results of sampling, it should be stressed that sampling gives a true picture if used under suitable controls. Mere dislike should not stand in the way of the legitimate econ-

omy which results from sampling. Economy is, of course, its principal advantage.

The chief disadvantage of sampling is that it fails to give data on every dwelling in the area studied. Law enforcement in individual properties cannot be based on a sample, nor can the findings be used for other intensive reference in the day-to-day work of local agencies.

On the whole, sampling is advised where studies of quite large areas are important for broad policy-making purposes and where a large staff is not possible or time does not permit spreading the work over an extended period.

If sampling is adopted, a ratio of 50 percent is virtually as good as complete enumeration. It will permit interpretation of the data by blocks or block frontages in all except unusually small blocks. So high a sampling ratio is seldom necessary, however. A 25 percent sample is usually sufficient to permit analysis by blocks, though if blocks contain on the average fewer than 30 or 40 dwelling units a 33 percent sample may be wanted. A 20 percent sample may safely be planned if there is objective evidence from the Census or other studies that groups of blocks in the survey district are generally homogeneous and will thus permit sampling at random within such groups of blocks. In this case, of course, analyses cannot be made block by block, but this need not be a serious limitation for studies of broad purpose, as has been indicated in the New Haven survey findings of Part I. For very extensive studies, a sample of 10 percent or less may be safe, but such a low ratio should not be assumed in cost estimates without advice from the Committee on the Hygiene of Housing.¹

SOURCE OF PERSONNEL

Field and office staff. Do the sponsors have on their staffs competent inspectors and clerks who can be assigned full time to the study, or must field and office personnel be hired? The numbers of such personnel and the term of their service will depend on factors considered in Sections 2 and 3. As a rule, however, it is necessary to run a crew of at least four inspectors and one or two full-time clerks for efficiency even in a small study.

Director. Can the director be assigned to the project from the staff of a sponsor—full-time as necessary at the outset and conclusion of the project and part-time at other stages—or is he to be specially hired and his salary carried in full by the survey throughout its duration? In the latter case relatively large field and office staffs will usually be desirable to shorten the term of study and reduce overhead costs.

If both the dwelling and environmental surveys are to be made, will they have a single director or codirectors? If the latter, will the two persons contemplated for

¹ Procedures for sampling, which will be set up by the consultant, are briefly discussed in Appendix A-3.

PERSONNEL REQUIREMENTS

these posts be able to work harmoniously together on the basis of equal responsibility, or is one to be designated as subordinate to the other? Senior responsibility may well be assigned to the director of the dwelling survey, both because he will normally have the larger staff and because the chief instrument of analysis and interpretation—the dwelling punch cards—will be in his charge.

Where equal authority of codirectors is assumed to be workable, some scheme for resolving differences between them should be clearly formulated.

REVIEW AND UTILIZATION OF FINDINGS

Is it intended that the director shall be wholly responsible for interpretation of the results and preparation of a report, or will principals of cooperating agencies wish to participate in this stage of the work? In the latter case, will the director report to a reviewing committee of sponsors, and is the makeup of this group clearly visualized?

Is it the plan that findings will be released in the form of a published report, or are they desired primarily for internal use of sponsoring agencies?

Is it assumed that original data of the study should be made available to organizations not participating in the basic study, for special analyses of the punch cards or field schedules?

TIME AND MONEY BUDGET

Can a preliminary statement be made, for guidance of the director and consultant, as to the amount of time and money available for this study? This question may be approached from either of two viewpoints:

- a) Certain areas are to be studied and certain purposes served; how much will it cost to achieve these purposes?
- b) A certain amount of personnel time or funds is available; what is the most useful kind of study that can be made within these limits?

The director can test the adequacy of a proposed budget by means of general or detailed cost estimates described in Section 3.

How will the study be financed: by assignment of personnel on regular payrolls of the sponsors, with a cash allowance for materials and consulting service; or by special appropriation for the entire project?

2. Personnel Requirements

TYPES OF PERSONNEL

Two types of employees will comprise the basic staff: inspectors or enumerators for the field work and clerks to receive, process and tabulate the findings.³ Within

³ Clerks will be referred to as women and inspectors as men, though persons of either sex may be used in either category. The terms inspector and enumerator will be used interchangeably for members of the field staff.

each type one or more specialized persons will usually be wanted: a chief clerk and a chief inspector or field squad leaders.

Drafting and stenographic help will usually be needed in late stages of the survey for mapping the results and preparation of a report.

RATIO OF CLERKS TO INSPECTORS

Determining the size of staff in relation to the size and allowable duration of a given project is considered in Section 3, but the ratio between field and office personnel calls for separate emphasis. It may not be appreciated by the sponsors that about as many man-weeks of clerical time as of field time are required to receive, check, process and tabulate the findings. This does not usually mean that the staffs must be of the same size, but that a somewhat smaller clerical staff will be required for a longer period than in the case of the inspectors.

Ratios between field and office staffs may vary considerably, depending on the extent to which processing and analysis are to overlap in time with data collection. The duration of the project will thus influence not only the size but the composition of the staff.

It has been pointed out that it is not efficient, even in the smallest study, to use fewer than four full-time enumerators and one or two full-time clerks. A ratio of one clerk for each four inspectors is an efficient combination during collection of data if the clerical staff can be augmented at the end of this phase, and if delay in processing and analysis is permissible.³ A ratio of two or three clerks to four inspectors, however, can be used through most of the data collection period with equal or better efficiency and with considerable reduction in overhead cost if office rent and full-time salary of the director are being charged to the study.

If data collection, processing and analysis must be done as far as possible during the same period (as in the case of a project with very limited time—or on the other hand an indefinitely continuing study where all operations must be kept in balance), approximately one clerk to each enumerator will be wanted from the time data collection is under way in volume. Such a ratio, while economical in terms of overhead cost, will complicate the planning of office work and may tend to demand full-time attention of the director throughout the study.

RESPONSIBILITIES OF PERSONNEL; BASIS OF SELECTION

Chief clerk. The chief clerk has immediate charge of office operations for all phases of the study, and is re-

³ If all processing and analysis can be deferred until after data collection, a clerk should be able to handle the office functions of data collection (assignment, reception and checking of schedules) for about eight full-time inspectors. In a project with fewer than eight field workers, a full-time clerk should still be used, since part of her time during data collection can be devoted to operations of the processing phase.

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sponsible only to the director. She should be selected with special care, for the person in charge of daily office operations can do much to make or break the efficiency of the study and the accuracy of results. She should have the ability and authority to supplement instructions issued by the director when necessary, and to make special field assignments. She should be temperamentally capable of maintaining the respectful cooperation of the field staff.

Other clerks. These should be selected insofar as possible for orderliness of work habits, ability to handle simple figures accurately, and dependability in following instructions as to checking and other routine operations. Familiarity with a calculating machine or slide rule is desirable, and at least one clerk should be a typist.

Standard time allowances given later for cost estimating are based on the performance of clerks who were not especially quick. Clerks who are alert and have good manual coordination may thus be able to save appreciable time under these allowances by taking advantage of short cuts possible in laying out the work or by maintaining a rapid pace without exhaustion.

Inspectors. The function of inspectors is to complete the dwelling schedules in the field. Inspection personnel of sponsoring agencies should provide a number of suitable candidates. Enumerators need not, however, be experienced in housing inspection, since they will be specially trained as to the items of this appraisal. Successful field workers have been developed from a wide variety of persons without previous experience, including salesmen, public health nurses, factory workers and college students. The essential requirements are willingness to be trained in the exact procedures of this method, dependability, acceptable bearing in public, and normal intelligence and health (enumerators may be called upon to climb many stairs each day and to go about in bad weather).

Women have been used in the field with good success in several studies, but it may be undesirable to assign them to some extremely low-grade districts.

Chief inspector; squad leaders. While a very small field staff may be handled by the director acting as his own field supervisor, even a group as small as four to six inspectors will usually benefit by designation of a chief inspector. A crew of eight or more, or one with territory far from the office, should definitely have such leadership both in the interest of good supervision and to minimize time lost through reporting individually to the office. Specific duties of the chief inspector are set forth in Chapter III, Section 4.

In a large study, squad leaders may be needed for each group of six to ten inspectors, either in addition to the chief inspector or replacing him. Squad leaders may be expected to spend a considerable part of their time in enumeration of schedules.

In the absence of special field supervision, inspectors may be generally responsible to the chief clerk.

TRAINING

The staff will not be trained before the consultant's visit, but some arrangements should be made in advance and the director should be familiar with the general objectives of the training period.

Field staff. Arrangements should be made for access to several occupied dwellings for training purposes. These should be chosen to represent the types of dwellings which will be surveyed, though they need not be within the survey area itself. Health or building department inspectors may be able to indicate families who would be willing to open their homes for inspection by the trainees.

If access cannot be had to occupied dwellings of the type desired, homes of staff members might be used for part of the training. Even though these homes are of better quality than those to be surveyed, they will illustrate the operation of many schedule items.

Access to one or two vacant dwelling units in addition may permit some of the training to be done without imposing a flock of visitors on a patient housewife.

The training program for inspectors will vary in detail according to the scope of the project or background of the staff. The consultant will plan a program suitable for local needs, and will direct it if the field crew can be assembled during his visit. Otherwise he will demonstrate field procedures to the director and chief inspector, coach them in the salient points of enumerator-training, and supply written outlines and other training materials.

About a week should be allowed for training and field practice. A minimum of three days will be needed for instruction. The fourth and perhaps also the fifth day should be devoted to practice enumeration as a test of the inspectors' understanding of the schedules.

All enumerators should be selected before the training program begins and it should be insisted that each attend all training sessions.⁴

Office staff. No formal period of schooling such as that described above is needed for the clerical staff. The chief clerk will be trained by the consultant to perform all the office operations of data collection, processing, and analysis, and she can train other clerks in each operation as the time for it arrives.

Training will be given primarily through handling practice materials supplied by the consultant. These include a set of enumerated schedules, arranged to present in a compact series of cases both the usual dwelling conditions and various special problems which may

⁴ Only in an emergency are inspectors to be added to the staff after the original training period. Should this be necessary the director must see that each new worker receives training equivalent to that of the original staff.

ESTIMATES OF COST AND DURATION

be encountered during a study. By carrying these schedules through the operations of checking, scoring, etc., the clerk will gain experience and confidence before she is required to handle the inspectors' output in volume.

Both the director and chief clerk will be given practice in the various steps of analysis by means of a set of completed punch cards, selected from several surveys so as to present a wide range of practical problems on a condensed scale. From these punch cards standard tables and charts can be made and interpreted under supervision of the consultant—this also without waiting for field results of the local study.

GENERAL PERSONNEL CONSIDERATIONS

Volunteer or part-time help. While volunteer or part-time status has no bearing on the general qualifications of personnel, a note of caution is in order. Those who work on a part-time basis or without pay (or under any other loose arrangement which lacks the element of organizational discipline) can cost more in the administrative burden and confusion imposed than they contribute in production.

Credentials. The field staff should be supplied with proper credentials by a sponsoring agency. Official inspectors will presumably have these, but other enumerators should be supplied with a letter, badge or other indication that it is their duty to obtain housing information and that they are justified in requesting access to dwellings. If health or building department inspectors are not used, the best practice is to have the special enumerators deputized as temporary inspectors by one of these departments. Necessary arrangements should be made in advance through the appropriate commissioners or bureau heads.⁵

When to hire or assign personnel. The chief clerk might be employed a few days before the arrival of the consultant. This would permit her to assist the director in various physical and administrative preparations, described later in this chapter. In any case she should be available during the entire consulting period. Other clerks will be enrolled later in accordance with a time schedule which will be developed as a part of the cost estimates.

While the chief inspector should also be available during the whole consulting period, others of the field staff need not report for duty until their training period. This will commonly be during the latter part of the consultant's stay. Interviews with candidates should be held in advance, however, to determine their suit-

ability for and interest in the work to be undertaken.

Allowance for casualties. In recruiting inspectors it may be desirable to select extra persons to be given training, perhaps in the ratio of one to six or eight persons wanted. This should provide for the occasional worker who does not make the grade or who drops out voluntarily. This practice is usually not necessary in the case of the clerical staff, since replacement clerks can be readily trained during the course of office work.

Compensation. Rates of pay for personnel specially hired will of course be set by local practice. It may be noted that good inspectors have been found in New England at from \$150 to \$175 per month. Satisfactory clerks have been hired at the lower of these rates, but clerks whose chief merit was a low salary requirement have proved a definitely poor investment.

Payment by the hour, week or month will depend on local circumstances. In test studies directed by the Committee, an hourly rate has been used only where part-time personnel were employed. A piece-work rate—payment per schedule completed—might be considered. Since it has the obvious weakness of encouraging skimpy observation, it should be used only under close supervision.

Inspectors carried on a special survey payroll should be paid for training time if they work for some period to be determined by the director. It would seem reasonable to require a month of service before training time is paid in full, with pro-rata payment for lesser periods of service. The problem of payment for training time should not arise with clerical staff, since they are chiefly trained by actual performance of their duties.

3. Estimates of Cost and Duration

GENERAL ESTIMATES

It has been noted in Part I (Appendix 1) that six to seven man-months per thousand dwelling units is a normal allowance for enumeration of schedules and for clerical work—divided about equally between inspectors and clerks.⁶ Estimates based on this formula will suffice to gauge roughly the personnel required and the duration of field and office work with staffs of given size. The rate of seven man-months per thousand units should be used for studies up to two or three thousand dwelling units, or for the first two thousand units or so of a larger survey, with additional units tending toward a six-month figure.⁷

General estimates of this sort (including materials and director's time as cited in the appendix of Part I)

⁶ The allowance for inspection time is based on enumeration of 15 dwelling units per man-day—a rate indicated by average staff performance in several surveys.

⁷ The allowances cited will cover the chief clerk, whose time goes largely to productive operations rather than supervision. They will not cover a chief inspector unless a substantial part of his time is to be spent in enumeration of schedules. This should be possible, however, in a well-run study with a small field staff.

⁵ No survey thus far conducted with this method has encountered the problem of legal liability of a sponsoring agency for acts committed by an enumerator, but this question should perhaps be raised with any city department which is deputizing field workers. It should seldom be necessary to go so far as to carry public liability insurance on enumerators, but this could be regarded as a legitimate cost of the project.

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will often be sufficient for general planning prior to the consultant's arrival. Especially may this be true if the staff and director are to be recruited from available personnel of sponsoring agencies. Where this situation gives flexibility in the number of inspectors and clerks to be assigned and in the proportion of the director's time to be allocated to the study, detailed estimates can well be deferred until the consulting period.

DETAILED ESTIMATES

Closer preliminary estimates will probably be needed if the staff or director are to be specially hired. In this case the size of field and office staffs must be predicted for each stage of the project, and staff size should be adjusted so as to use the director's full time effectively through a period of minimum duration.

A procedure for cost estimates of this type is given in Appendix A-1, where time allowances are broken down into the various operations, and successive steps of a detailed estimate are given by an example. Such an estimate by the director, with alternate schemes showing different staff size and duration, will indicate the scale of operation that will give the best economy in total cost and the best utilization of the director's supervisory time.

Where conclusive agreement has been reached on the areas to be studied and other essentials of policy, estimates on this basis should give results on which a workable plan of staff organization and a provisional budget can be based in advance of the consulting period. Even in this case, however, the budget should not be finally adopted prior to the consultant's review, and a contingency reserve should be included (at least 10 percent, and preferably 15 or 20 percent of total cost) in case local factors adversely affecting cost have been overlooked.

A detailed estimate can best be made after reading all chapters of this volume, for they offer choices in operating practice which may influence organization of the staff and distribution of the director's time in supervision.⁸

With the background provided by this manual and with the safeguard of a contingency allowance, the director need not hesitate to commit himself to execution of a sound study within the estimated cost. Administrative controls, described later, provide for checking the cost of each stage of work in relation to the estimate, and numerous adjustments are possible in the course of the study if it is found that any phase is outrunning its allowance.

⁸ Most important here is the choice, possible for an agency with access to tabulating machines, between Hollerith type and marginal punch cards for analysis. Tabulation by the agency's regular machine crew will reduce the clerical work to be done by the survey staff, but analysis with marginal punch cards, discussed in Chapters IV and V, may have definite advantages in flexibility of control by the director.

4. Procurement and Administrative Preparation

Arrangements discussed below should be carried forward as far as possible before the consultant's arrival.

OFFICE FACILITIES

Space and furniture. One or two office rooms will be required for the director and clerks, serving also as the place where field assignments will be issued to and returned by the inspection staff.

Determining factors in the size of office needed are the maximum number of clerks to be employed at the peak of operations (derived from estimates discussed in Section 3) and the furniture and equipment discussed in paragraphs which follow.

Work surfaces in the form of desks or tables should be amply provided. Aside from desk space for the director and each clerk, a large table or counter is essential for use by the field staff when they report to the office.

Much close visual work will be done on the schedules and other forms of the survey; the office should have good general illumination and there should be electric outlets permitting individual lamps on desks or other work surfaces. Space which cannot be readily ventilated for summer operation, or adequately heated in winter, should obviously be avoided.

A clothes tree, wardrobe cabinet or other arrangement for hanging coats and hats is desirable.

Wall space should be available for mounting one or more large reference maps of the survey areas.

Where dwelling and environmental surveys are under the same director, separate but adjacent rooms for the two staffs will be convenient.

Standard office equipment. Skimping on office equipment is false economy. Staff time costs money, and it is more expensive for clerks to do arithmetic on scratch pads than to rent a calculating machine or buy slide rules.

A typewriter will be needed throughout the study for preparation of files, issuance of bulletins, layout of analytic tables and the like. It should have a carriage that permits typing across substantially the full 11 inch dimension of regular office stationery. A machine with elite type face (12 letters to the inch) should be procured. Both of these requirements are dictated by the layout of the standard form used for tabulation, described in Chapter V.

The calculating machine will not be needed until the processing phase. An adding machine can be substituted for it in some operations.

Standard 8½ by 11 inch letter files will accommodate all forms and records used in the appraisal. File drawer capacity should be provided in the ratio of about one drawer per 1,500 dwelling units, with a minimum of three file drawers to permit separate handling of materials during the major phases of execution.

PROCUREMENT AND ADMINISTRATIVE PREPARATION

A bulletin board or equivalent mounting space should be provided for posting supplementary instructions, memoranda and the like.

PROCUREMENT OF MATERIALS

Checklists; general precautions. The equipment and supplies required for each phase of the study are listed in Appendix A-2, where the costs of materials to be obtained through the Committee on the Hygiene of Housing are also given. These lists should be checked early in the planning stage to make sure that local sources can provide the items specified for procurement through them.

The period required for delivery of materials to be obtained through the Committee may influence the timing of data collection and processing, and this factor should be taken into account in scheduling the study.

If it is required to use official channels of procurement, cumbersome purchasing procedures may involve serious delays or difficulties in getting the materials specified. Problems of this sort should be explored and dealt with either by cutting red tape or postponing the start of the study.

Supplies. The only expendable supplies not obtained from local sources are the forms furnished by the Committee or upon its authorization: the unit and structure schedules, appraisal forms, standard tabular forms, and marginal punch cards if used.⁹ All these except the Tabular Form are supplied with a special imprint in the heading to identify the study.

Schedules are printed as a special run for each survey. Printing may be done either in New Haven from electrotypes of the Committee, or by a local offset printer from reproduction proofs supplied by the consultant.

Where machine punch cards are used, a layout appropriate to the study can be made on a stock 80 column card during the consulting period, or if time permits a special card can be designed and printed for the study.

Where marginal punch cards are used, they are specially printed if the study covers 2,500 units or more. During the war about three months was required to obtain delivery. While the manufacturer's delivery schedule is expected to return rapidly to the normal basis of approximately thirty days, the Committee will maintain a stock of these cards from which initial needs of a study can ordinarily be met to avoid undue delay in processing. A survey of fewer than 2,500 dwelling units could be supplied from this stock.

Special office equipment. To be supplied by the Committee or other outside sources are the templates for scoring the schedules, hand punches or a power punch for marginal punch cards if these are used, and the percentage scaling device for marginal punch cards.⁹

Field equipment. Appendix A-2 lists certain supplies

to be prepared for each inspector. This task may be assigned as a fill-in job for the chief clerk during the period of administrative preparation.

Instructions for inspectors (Field Procedures, Appendix B) are to be ordered from the Committee, one copy for each member of the field staff.

COORDINATION WITH ENVIRONMENTAL SURVEY

If the environmental study has a separate head, the dwelling survey director must work with him to set the scale and timing of both studies so that the environmental scores for each area will be available when dwelling data are scored. In general, this means that environmental work in any area should proceed somewhat ahead of the dwelling survey.

As the work progresses, the two directors should establish uniform practice in certain independent but parallel operations such as tabulation of the findings and preparation of maps and charts.

Where the director is responsible for both environmental and dwelling surveys, he will need to coordinate the plans for these two efforts. One who directs both studies should not ordinarily plan to use the same personnel on both. A separate staff should be organized for each unless the environmental study is to be completed before the dwelling survey is undertaken. The two appraisals are based on wholly different kinds of field and office operations, and best efficiency will be obtained by complete separation of the projects—at least until the stage where the director assumes primary responsibility for interpretation of the results.

MAPPING AND NUMBERING THE STUDY AREAS

Reference map. Areas proposed for study should be outlined on a map of large enough scale to permit its use for various reference purposes during the course of the project. A scale of 400 or 800 feet to the inch is large enough to permit numbering or annotating individual blocks.

The scheme of block and district identification described in the following paragraphs should be recorded on this general reference map.

Identification scheme. A clear system of numbers for blocks and larger areas will be needed throughout the study. Such a scheme can be developed and tentatively adopted in advance of the consulting period, to expedite the preparation of files and administrative controls discussed in later chapters.

The plan of identification, like the boundaries of areas previously discussed, should usually be coordinated with an official scheme already in use. It is desirable to base the system on Census tract and block identification, rather than on a locally developed scheme, since the 1940 Housing Census bulletins give uniform basic data to which reference will almost universally be wanted.

⁹ Forms and equipment are illustrated and explained in Chapters III-V, in the sections on Primary Materials.

ORGANIZATION OF THE DWELLING SURVEY

District numbers. The major subdivisions of the survey area are designated as districts. A district may be created for each Census tract or comparable official grouping of blocks. While the district numbers may be identical with those used in the previous official series, it is often preferable to establish a new series of numbers, starting with district 1.¹⁰ This gives continuity of numbering despite jumps across the map, and by using low numbers it will conserve spaces on the punch card. Such an independent series can always be matched to the Census or other official base by a key list of numbers in the two series.

If it is felt that the practice suggested would create an unwieldy number of districts for analysis and final presentation of results, several tracts or other official areas may be combined into one district. In this case, the district number might be used with suffixes to show the merged tracts: for instance, if district 1 were created from tracts 17-20, the identity of these could be preserved by numbering the subdivisions of the new district as 1-17, 1-18, 1-19, and 1-20. Such treatment would permit analysis in breakdowns comparable to those of the other source of data.

Where new district numbers are created, these may be assigned either in the proposed sequence of enumeration or in an orderly sequence across the map. The latter is usually preferable from the viewpoint of final presentation. If the former scheme is chosen, at least a part of the poorest areas to be studied should be included among the districts scheduled for early enumeration.

Block numbers. A system of numbers for blocks within each district will ordinarily complete the identification scheme. The Census or other official scheme of block numbering within districts can be adopted unless the numbers involve three digits (numbers of 100 and over). In this case a separate system of numbers will probably be needed to conserve positions on the punch card, and a code can be prepared to key the new numbers to the official series.

GENERAL WORKING ARRANGEMENTS

Title of study. A definite title for the study will be wanted for many purposes: for titling maps, tables or a formal report; for payroll accounting, and so on. It is desirable to include the name of the city and perhaps the year of execution, as "1946 (Name of City) Joint Housing Survey." If the dwelling appraisal is made without the environmental survey, it is preferable to call it a dwelling study, not a housing study.

Administration of funds. A clear understanding

¹⁰ It is desirable that all districts and other areas be identified by numerals, for letters used as identifying symbols require coding or transcription before they can be entered on punch cards. No confusion will result from the practice recommended, even when the same numbers are used for areas of different rank, if the titles of these ranks are clearly formulated and strictly observed.

should be reached as to how funds are to be made available to meet personnel and other costs, what type of financial reporting the sponsors will expect, and the time-record or payroll practices of agencies which contribute personnel from their regular staffs.

Preparation for sampling. If sampling is to be used, the director should canvass the possible sources of sampling data discussed in Appendix A-3.

Publicity. It should be considered whether advance publicity is desirable to prepare the way for enumerators. Even if they operate in familiar districts, this inspection will involve new types of questions and observation, and explanation of the purpose may save time and help to allay doubt or suspicion.

Devices to be considered include releases through the local press and radio, announcements in churches or other neighborhood meeting-places, and notices to be taken home by school children. Such efforts need not be elaborate, since credentials carried by inspectors constitute a notice to householders of the purpose and authority of the study, but some thought devoted to these matters may save trouble-shooting later.

Sponsors' agreement. When general plans have been made and costs estimated, it will be desirable to draft a working agreement or memorandum of understanding. This should define the purposes and scope of the study, state the responsibilities and contributions (amount or share) of the sponsor agencies, and indicate the timing of major phases of the work. A preliminary draft of such a statement might be drawn up in advance of the consultant's arrival, for review and adoption during the consulting period.

5. Consulting Service

REQUEST FOR SERVICE

Correspondence between the sponsors and the Committee on the Hygiene of Housing prior to appointment of the director may have indicated when the Committee's staff consultant could be made available to help in setting up the local study. If not, contact with the Committee will be an essential part of the director's planning effort. In requesting consulting service the purposes, size, and desired timing of the study should be described in some detail. This will permit the Committee's staff to judge the amount of consulting service necessary and the feasibility of scheduling service at the time desired.

PREREQUISITES TO CONSULTANT'S VISIT

Most efficient use of the consultant's time will be possible if he does not arrive until general working plans have been made. Specifically, survey areas should have been tentatively selected and preliminary time and cost estimates made; the director should have familiarized himself with the procedures by studying the chapter

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text of the present volume; and at least the chief clerk and chief inspector should have been selected.

The director, chief clerk and chief inspector should all be available whenever needed during working hours every day of the consultant's visit. This is imperative for an efficient setup of the project, and the consultant should not be asked to come at a time when it cannot be arranged.

SERVICES TO BE PERFORMED

A principal function of the consultant—the training

of personnel—has been discussed in Section 2 above. As to matters of policy and organization, the consultant will criticize the proposed scheme of the study in relation to the purposes of the sponsors, assist if desired in further refinement of area selection, judge the feasibility of time and cost estimates, and give such other help as may be needed to assure a sound and balanced study. As indicated in later chapters, he will advise the director on various choices offered in the mechanics of data collection and processing, and will outline a suitable plan for analysis and presentation of the findings.

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	9. Toilet	20
	10. Bath	20
	11. Water Supply (location and type for unit)	20
	12. Washing Facilities	20
	13. Dual Egress	20
	14. Electric Lighting	21
	15. Central Heating	21
	16. Rooms Lacking Installed Heater	21
	17. Rooms Lacking Window	21
	18. Rooms Lacking Closet	21
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Chapter II

THE RATING SYSTEM AND APPRAISAL ITEMS

As background for judgments to be made during a survey, the director will need to know more about the content and rating system of this technique than could be told in Part I. Later chapters of the present manual, dealing with execution of a local study, have little occasion to discuss the Committee's reasons for including new types of appraisal items, the factors which govern the content of each item, or the means by which penalty scores were set and tested. Concerning these matters, which comprise the substance of the method and determine its validity, the director or other critical observer is entitled to full information, which the present chapter is intended to supply.

1. Penalty Scale

CONSTRUCTION AND VALIDATION

The rating system, briefly described in Part I, is based on the judgment of experienced professional workers in public health, housing and city planning. Members of the Committee and others, serving as a consulting panel on scale-construction, were asked individually to designate scores for all items of the field schedules. Every condition reportable on the schedules was separately evaluated as a detriment to health, safety or basic amenity. In assigning scores to each schedule item, members of the panel considered whether the field information is of a type giving reliable and objective data; whether the item can be expected to have constant significance as between different types of housing, various economic strata and the like; and whether the item is a true reflector of the detriment it seeks to measure. Specially designed scale-construction forms were used to assure systematic consideration of each item, and definitions of penalty classes were formulated for assignment of scores.¹¹

Under this scheme scores were assigned in the following class ranges:

- 1-3 points for a condition deemed to involve only slight threats to or impairment of health or safety;
- 4-7 points for a condition involving such detriments in moderate degree;

¹¹ The form and definitions in full are given in Part I, Appendix 5.

8-15 points for a considerable and ever-present threat to health and safety;

16-30 points for conditions involving extreme and ever-present threats to health or to life itself.

Impairments of amenity alone were given scores in the next smaller class than for comparable detriments to health or safety.

The range within these classes was used to adjust the score according to reliability of the data and constancy in significance of the items, as discussed above. Scores were reduced within a class for items showing any weakness on these accounts.¹²

For schedule items consisting of several parts, the scores for each part were established separately. An instance is toilet facilities: each member of the panel designated scores for inside or outside location, flush or nonflush fixture, and sharing or private use.

Scores recommended by members of the panel were plotted in a scatter diagram for study and reconciliation. So little divergence was found, however, in the recommendations of individuals that reconciling them presented no difficulty. In fact, agreement was so close among the dozen experts who shared in scale-construction that it was thought unnecessary to involve a wider group in this burdensome task, as had been planned.

The scale thus constructed was first put to test in the 1943 New Haven pilot study cited in Part I.¹³ Thirty-five blocks containing 2,500 dwelling units were selected to cover the range from high income neighborhoods to the worst slums of the city. A 50 percent sample of these dwellings was surveyed, and the complete environmental appraisal was made. The classification of housing conditions obtained, ranging from quality grade A to grade E, was found by the reviewing group (including representatives of city, state and federal agencies as well as of the Committee) to correspond so closely to the manifest total character of the neighborhoods as to prove the essential validity of the scale.

Particularly noted by reviewers of this test were the accuracy with which the scale measured breaks in qual-

¹² This practice, which is thought to strengthen the scale as a whole, explains relatively small penalties for certain conditions in the maintenance group of appraisal items, where it is difficult to specify the minimum threshold of reportability.

¹³ Page 18, footnote 14.

THE RATING SYSTEM AND APPRAISAL ITEMS

ity from block to block (or even within blocks) and the fact that the ranking of blocks by scores was heartily endorsed by veteran sanitary inspectors with intimate knowledge of these areas.

Minor revisions in the scoring values have been made as the result of subsequent tests and official surveys in

other cities—chiefly refinement of occupancy penalties and adjustment of the scores for disrepair to a new schedule item on deterioration.

Figure 1 gives maximum penalties for the appraisal items under the final scale.¹⁴ Conditions incurring these maximum scores are explained in Section 3, together with the acceptable condition earning zero penalty for each item.

FIGURE 1. APPRAISAL ITEMS AND MAXIMUM STANDARD PENALTY SCORES

ITEM	MAXIMUM SCORE
A. Facilities	
1. STRUCTURE: Main Access	6
2. Water Supply (Source for Structure)	25
3. Sewer Connection	25
4. Daylight Obstruction	20
5. Stairs and Fire Escapes	30
6. Public Hall Lighting	18
7. UNIT: Location in Structure	8
8. Kitchen Facilities	24
9. Toilet ^a	45
10. Bath ^a	20
11. Water Supply (Location and Type for Unit)	15
12. Washing Facilities	8
13. Dual Egress	30
14. Electric Lighting	15
15. Central Heating	3
16. Rooms Lacking Installed Heater	20
17. Rooms Lacking Window	30
18. Rooms Lacking Closet	8
19. Rooms of Substandard Area	10
20. Combined Room Facilities ^b	—
	360
B. Maintenance	
21. Toilet Condition Index	12
22. Deterioration Index ^c	50
23. Infestation Index ^c	15
24. Sanitary Index ^c	30
25. Basement Condition Index	13
	120
C. Occupancy	
26. Room Crowding: Persons per Room	30
27. Room Crowding: Persons per Sleeping Room	25
28. Area Crowding: Sleeping Area per Person	30
29. Area Crowding: Nonsleeping Area per Person	25
30. Doubling of Basic Families	10
	120
MAXIMUM DWELLING TOTAL	600

^a Item score is total of subscores for location, type and sharing of toilet or bath facilities.

^b Item score is total of scores for items 16-19 inclusive. This duplicate score is not included in the total for a dwelling but is recorded for analysis.

^c Item score is total of subscores for structure and unit.

WHY THE MAXIMUM TOTAL SCORE IS NOT REACHED

The reader may have noted in Part I that while a total dwelling score of 600 points is theoretically possible, the median total score in grade E areas of the 1944 New Haven survey is only 80 points. It might be asked: Are not these houses less than one-sixth as bad as they might be; why should they be a matter of concern?

Part of the answer lies in the general fact that median scores for any considerable body of cases will seldom approach the maximum that is possible in an individual case. Further explanation is found in the nature of these schedule items.

Subtotal scores for maintenance and occupancy conditions in individual dwellings may run well up toward the possible maxima of 120 points apiece for these two groups: scores of 70-90 points for maintenance or occupancy may often be found in extreme slum areas. In the facilities group, however, with a theoretical maximum of 360 points, the condition is quite different and no such high proportion of the total will be incurred except in the rarest cases. The first reason for this is that certain facilities items tend to be mutually exclusive. A downtown tenement, for instance, may show heavy penalties for inadequate fire escapes and for daylight obstruction, but it will almost always escape the possible maximum scores of 25 points each for disapproved non-public water supply and sewage disposal from such toilets as it may possess.¹⁵ A shack in the outskirts, on the other hand, may be in wretched repair and lack the basic sanitary requirements, but it will not be penalized for lack of fire escapes or for dark public halls. A second and equally potent factor is that the scale for each item must provide for the worst expectable condition, which may seldom happen—such as all rooms in a unit of substandard area, extreme daylight obstruction on all sides of a structure, or windows lacking in several rooms.

No individual dwelling has been found in any survey with this method to date that shows a total dwelling penalty score above 300 points—half of the theoretical maximum—though tests have been run in the most degraded sections of large cities such as Washington, Philadelphia and Memphis. As a practical matter it can be said that individual dwelling scores in the range

¹⁴ Item numbers in Figure 1 are those used in the Unit Appraisal Form, not those of the field schedules. The appraisal form is shown in Figure 9.

¹⁵ The items cited for illustration are 2, 3, 4 and 5 of Figure 1.

BASIC DEFICIENCIES: CONCEPT OF SUBSTANDARDNESS

from 200 to 300 points represent dwellings close to the bottom of the scale, and that medians above 75 points or so indicate definite problem areas.

ADVANTAGE OF A VARIABLE MAXIMUM

It should be stressed that this scale is not one in which a fixed round value such as 100 or 1,000 points is taken to represent the best or poorest possible house. Instead this system starts by including in a schedule all the significant items which can be clearly defined and reliably observed; it continues by assigning to each deficiency a score in accordance with its seriousness—let the possible maximum score be a round number or not as may happen; and it ends with incurred scores which measure the occurrence of deficiencies that are significant in the locality.

While the meaning of a given score is not apparent in the same automatic sense as where 60 credit points might mean 60 percent compliance with a standard of 100, this system has the great advantage of no arbitrary ceiling on the scores (or more properly, no floor below them). If items of local significance are added to the schedules, their scores are added to the standard total and a floating maximum is provided to accommodate all items found worthy of enumeration. Conversely, if a standard item has minor significance in a given locality (as in the case of heating facilities in the deep South) it is not only equitable but necessary to reduce the item score and hence the possible total.

EFFECT OF ADDING ITEMS OR VARYING THE SCORES

The addition of a local item or two to the schedules has the value of bringing into the scoring picture conditions important in one locality but not in others. Changes in the theoretical maximum score as a result of such additions will usually have only minor effect on the actual total scores and thus on comparability of findings from one city to another. Even should comparability thus be impaired, the gain in local meaning is probably greater than the loss. In any case, occurrence of the standard schedule items can always be compared by tabulating individual deficiency items.

Moderate local variation from standard scores for a few of the regular appraisal items would likewise have little effect as a rule on the total scores incurred. This limited effect of varying the score is in general, however, an argument for leaving the standard scores undisturbed rather than for making casual minor changes. The reason for this is that the standard scores have been so adjusted as to give a maximum of discrete meaning to each of the scores possible for any item, as will be shown later in discussion of the punch card. Minor local adjustments of scores, made in search of supposed greater sensitivity, might gain little in that direction and lose much of the clarity for analytic purposes which has been designed into the standard scale.

2. Basic Deficiencies: Concept of Substandardness

PURPOSE OF DESIGNATING BASIC DEFICIENCIES

Basic deficiencies, listed in Figure 2, include those major substandard conditions which can generally be corrected by official agencies under legal standards. With the exception of bath and electricity (items 10 and 14) there is no condition specified as a basic deficiency which will not be covered by legal requirements with any pretension to progressiveness.

While lack of a bathtub is not considered a substandard condition by more than a handful of statutes or ordinances, it is generally recognized by local housing authorities as one of the forms of substandardness which warrants admission of a family to a housing project. Lack of electric lighting may be less widely recognized as a major substandard condition, but studies of the Committee have established that—aside from the fire hazard involved—nonelectric lighting will almost always result in grossly inadequate light for children's

FIGURE 2. BASIC DEFICIENCIES OF DWELLINGS

ITEM NO. ^a	Condition Constituting a Basic Deficiency ^b
<i>Facilities</i>	
2	Source of water supply specifically disapproved by local health department.
3	Means of sewage disposal specifically disapproved by local health department.
9	Toilet shared with other dwelling unit, outside structure or of disapproved type (flush hopper or nonstandard privy).
10	Installed bath lacking, shared with other dwelling unit or outside structure.
11	Water supply outside dwelling unit.
13	Dual egress from unit lacking.
14	No electric lighting installed in unit.
16	Three-fourths or more of rooms in unit lacking installed heater. ^c
17	Outside window lacking in any room of unit. ^c
<i>Maintenance</i>	
22	Deterioration of class 2 or 3 (penalty score, by composite index, of 15 points or over).
<i>Occupancy</i>	
26	Room crowding: over 1.5 persons per room.
27	Room crowding: number of occupants equals or exceeds two times the number of sleeping rooms plus 2.
28	Area crowding: less than 40 square feet of sleeping area per person.

^a Numbers refer to items of Figure 1.

^b Of the 13 defects which can be designated basic deficiencies, 11 are so classified when the item penalty score equals or exceeds 10 points. Bath (item 10) becomes a basic deficiency at 8 points, for reasons involving comparability to the U. S. Housing Census; deterioration (item 22) at 15 points for reasons internal to that item.

^c The criterion of basic deficiency for this item is adjusted for number of rooms in the unit.

THE RATING SYSTEM AND APPRAISAL ITEMS

study or other close visual tasks normal to family life.

It is intended that dwellings designated as substandard by virtue of one or more basic deficiencies shall be dwellings which enforcement agencies and the man in the street will recognize as being substandard in a fundamental sense. The basic deficiency is not an academic or refined concept, nor does it depend on new types of housing judgment.

Where innovations have been introduced under this technique—as in the requirement of item 29 that all but the smallest units should have a living room or its equivalent, not needed for sleeping—heavy penalty scores may be assigned to extreme conditions, but a basic deficiency is not designated, exactly for the reason that doing so would weaken the concept of basic deficiency as a measure of officially actionable substandardness.

Whereas item penalty scores may be modified within the limits suggested above, changes will not normally be made in the specifications of basic deficiencies, except as to heating facilities in mild climates. A principal reason is that a constant set of basic deficiencies maintains comparability of findings from one city to another despite variations in the item scores.

DEGREES OF SUBSTANDARDNESS

The concept of basic deficiency provides not only a means of designating officially substandard dwellings, but it also measures the degree of such substandardness in the same way that scores measure the cumulation of all deficiencies. Dwellings with one basic deficiency are substandard, and in an exact sense, but those with four apiece are clearly that much more in need of remedial action.

As will be shown in Chapter V, this refinement over the usual classification—into standard and substandard dwellings only—provides a strong basis for discriminating official policy.

3. Appraisal Items

This section explains the health, safety or other significance attached by the Committee to each appraisal item, as presented in Figure 1. Where an item represents a new type of evaluation, the reasoning behind it is more fully explained than where it follows usual housing survey practice.

Each item is identified by its number on the Unit Appraisal Form, followed by the number of the field schedule item from which it is scored. For each item the condition earning zero penalty and the condition incurring the maximum score is specified.¹⁶

The items apply equally to family dwelling units and rooming units except as noted. Scores for an item may

¹⁶ The curious reader can determine scores between these extremes by reference to the field schedules in Chapter III and to the scoring templates in Appendix C-3.

vary slightly in a rooming unit from the dwelling unit values given here.

FACILITIES

Deficiency items 1-20 deal with the fixed physical characteristics of the dwelling or rooming unit and containing structure. Items 1-6 give the characteristics of the structure and items 7-20 give those of the individual unit.

1. Structure: Main Access: scored from schedule item S7. The purpose is to penalize a structure not provided with normal access from a street, on the ground that access through a rear yard or alley may involve specific hazards, such as lack of light at night or accident hazards in circulating through a space which may not be provided with standard walks and may be littered with refuse. The item is not intended to measure the more fundamental defects often associated with rear yard or alley structures; they will be disclosed by other deficiency items.

The standard penalty scores range from zero for normal street access to 6 points for main access through an alley. Local variations in the significance of rear yard or alley access may suggest revision of these scores.

2. Water Supply (source for structure): scored from items S8 and S8a. This item distinguishes between structures served by regular municipal or other public source and those which have private supplies or lack a water supply on the premises. The purpose is to penalize slightly all structures depending on a source of water which is not publicly supervised and may be subject to contamination, and to impose severe penalties for water supplies which the health department deems positively unsafe. Scores range from zero for public supply to a maximum of 25 points for a nonpublic supply disapproved by the local health department. Where a supplementary appraisal is made under S8a, this item can become a basic deficiency with specific disapproval by the health department. Where no such supplementary appraisal is made, the maximum standard score is 8 points for no water supply on the premises and the item does not become a basic deficiency.¹⁷ A token score of 3 points is given for any nonpublic supply, and all such cases can be segregated by punch cards for further investigation.

Local conditions may warrant changes in the standard scores for this item.

3. Sewer Connection: scored from S9 and S9a. In this item, resembling the one above, distinction is made between structures served by public sewers, those with private septic tanks or other water-carriage system, and those with no water-carriage system of sewage disposal. The purpose is to penalize structures which do not have assurance of safe and adequate sewage disposal through

¹⁷ Units in such structures will show a basic deficiency for their individual supplies, under item 11, below.

FACILITIES ITEMS

connection to a public sewer, and to impose severe penalties for disposal facilities deemed actively unsafe by the local health department.

Standard scores range from zero for public sewer connection to 25 points for sewage disposal disapproved by the local health department. In case of such disapproval, a basic deficiency is designated.

In the absence of a supplementary appraisal by the health department, the maximum score is 8 points for no water-carriage disposal and the item is not charged as a basic deficiency. A token score of 3 points for private water-carriage disposal serves here, as in the previous item, for segregation of these cases in analysis of punch cards.

The penalty scores for sewer connection are in addition to those for toilet facilities of the dwelling or rooming unit (item 9, below).

This and the previous item will generally produce zero scores in central urban areas. Penalties would automatically accrue to some suburban and most rural housing, but these are not severe if the private well and sewage disposal system are in good order.

4. Daylight Obstruction: scored from S16a. This item measures the degree to which a structure's daylight is obstructed by adjacent buildings. This is done by counting the number of windows on each side of the structure, then reporting the height, distance and lateral placement of buildings on each side. These field data are processed by office calculations which translate them into a single obstruction factor for the building as a whole. The score is based on this factor. Special penalty is automatically given for obstruction (or special credit for lack of obstruction) of windows on a southerly side, which are essential to adequate sunlight.

Standard scores range from zero for structures with insignificant obstructions to 20 points for the most extreme conditions.¹⁸

The penalty scale is so constructed that scores of 5 or 8 points will result when daylight obstruction is serious enough to necessitate the use of electric lights on a clear day in a substantial proportion of the rooms in the structure. Very few structures will incur the maximum penalty of 20 points, and buildings must be extremely close together with a high percentage of windows on the obstructed sides to incur a penalty of 10 or 15 points.

This item is not classed as a basic deficiency because daylight obstruction has not heretofore been subject to objective measurement in extensive surveys, and official regulations do not deal consistently with this condition. Daylight obstruction is, however, a problem of fundamental importance in many communities.

In cities where daylight obstruction is not character-

istic (as where row houses are the prevalent type and where these are so spaced as to receive adequate daylight both front and rear), the consultant, after inspection on the ground, may advise elimination of this item. If the item is used, standard scoring values should be retained.

No attempt is made in this item to appraise the adequacy of natural light in individual rooms or units of the structure. A unit containing a room without windows will, however, be penalized under deficiency item 17, below.

5. Stairs and Fire Escapes: scored from S10. The adequacy of means of egress from multiple dwellings and other dwelling structures of three or more stories is evaluated, taking into account the number of exits and selected indices of deficiency in the exits present. Penalty scores range from zero, for two means of egress with no deficiency indicated, to 30 points for a single means of egress from a building of four stories or higher.

Requirements are relaxed for structures of so-called full fireproof construction. Local peculiarities in types of dwellings may necessitate supplementary instructions or a change in scores for this item—a point to be checked with the consultant.

Although this item can incur high penalty scores, it is never charged as a basic deficiency. The reason is that in a structure with inadequate stairs and fire escapes, certain units such as those on the ground floor may individually have adequate egress. Therefore, the basic deficiency for means of egress is charged only to units, under Dual Egress (item 13 below), where individual units with adequate egress will escape penalties.

6. Public Hall Lighting: scored from S11. Penalties are imposed on structures containing public halls if a substantial part of those halls shows inadequate daytime lighting or is without installed artificial light fixtures. These deficiencies are scored as indices of accident and moral hazard and as obstacles to cleanliness. Simple criteria which do not involve the use of instruments are provided for the enumerator.

Penalty scores range from zero for halls with adequate daytime lighting throughout and with light fixtures in each story of each hall, to 18 points for structures with no hall light fixtures and a substantial part of the halls showing inadequate daytime lighting.

7. Unit: Location in Structure: scored from heading of Unit Schedule. This item penalizes units located in a basement, or on the fourth floor or higher in a building without elevator.

For basement units a token penalty score of 3 points is assigned, on the presumption that such units will be inferior to others in such respects as size of windows, exposure to wind-blown dust or debris through placement of windows close to ground level, and tendency toward dampness.

No attempt is made in this item to score the more

¹⁸ Since the obstruction factor gives a combined result for the conditions of all four sides of the structure, no single quantitative specification can be given of the condition which would incur the extreme score.

THE RATING SYSTEM AND APPRAISAL ITEMS

fundamental defects commonly associated with basement units, such as poor toilet facilities, windowless rooms, etc., for these conditions are reported separately under other deficiency items. In other words, this item, like item 1 (main access to structure), imposes a small penalty for the deficiencies inherent in poor location, and the occasional high grade basement unit, like the occasional high grade rear yard house, is thus protected against a large and inequitable penalty on the basis of its location alone.¹⁹

In the case of units on the fourth or fifth floor of a walkup building, penalties of 4 or 8 points are assigned. Units in such locations always involve excessive stair climb for all members of the household, with definite hardship or health hazards for mothers of small children, pregnant women and victims of cardiac impairment.

8. Kitchen (or Special Rooming Unit) Facilities: scored from D1. This item penalizes the absence of any or all of the standard kitchen facilities: installed sink, installed range and a refrigerator usable in all seasons. It also penalizes sharing of kitchen facilities. The item thus serves as an index of safety of food storage, adequacy of provision for cooking normal family meals, and of general convenience in the basic function of preparing and serving food. Scores range from zero for full private kitchen to 24 points for shared kitchen without sink and refrigerator.

Kitchen facilities are omitted from the Rooming Unit Schedule, and the corresponding item (R1) is used to report other facilities of special importance in that type of unit. The standard schedule provides for reporting lack of cross ventilation in any room, since this requirement is more important in rooming units than in family dwellings where bedroom doors can ordinarily be left open for ventilation. Other rooming unit deficiencies can be formulated in accordance with local practice or legal requirements, using blank spaces provided in schedule item R1.

9. Toilet: scored from D2. Toilet facilities available to the unit are scored in terms of location, type, and privacy or sharing. Three separate indices are thus provided as to the adequacy of this most basic sanitary facility. For rooming units the item is modified to provide for multiple toilets within the unit, and for sharing by a reasonable number of occupants without penalty.

Scores range, for a dwelling unit, from zero for a private flush water closet inside the unit to 45 points for a frostproof hopper outside the structure and shared by three or more families. A score of 45 points would also be assigned for the rare case of a dwelling unit with no toilet available.

A basic deficiency is shown for this item if the toilet is shared with another dwelling unit, if it is a privy of

other than approved sanitary type, or if the toilet is outside the structure.

By reporting and scoring separately the location, type, and sharing of the toilet, a better distinction is obtained than where a single Yes-No entry is made to show whether there is an inside private flush toilet. For example, a dwelling unit may have a private flush toilet which is not inside the dwelling unit but just outside in a locked compartment off the public hall. This is not an inside private flush toilet, but it is considerably better than one in the same location shared with another family. Under the method of reporting and scoring used, the private hall toilet described would receive a penalty of 8 points but would not be classed as a basic deficiency.

10. Bath: scored from D3. This item treats the bathing facilities available to the unit in a fashion similar to that described for toilets, above: with consideration of type, location and sharing. Scores range from zero for a private tub or shower with piped hot water inside the dwelling unit to 20 points for no installed bath available to occupants of the unit. A basic deficiency is charged if a bath is lacking, is outside the structure or shared with occupants of another unit.²⁰

A feature of this item is the distinction between installed baths with and without piped hot water. Test surveys have shown considerable percentages of so-called private baths with no hot water tap—a deficiency which largely nullifies the value of the bath.

11. Water Supply (location and type for unit): scored from D4. This item evaluates adequacy of water supply for the unit as distinct from safety of the water source for the entire structure, covered in item 2 above. Lack of piped hot water or the necessity of carrying water from outside the unit are penalized on the ground of inconvenience and as obstacles to normal cleanliness and good housekeeping.²¹ Penalties range from zero for piped hot and cold water inside the dwelling unit to 15 points for any supply outside the structure. Dependence on water supply outside the dwelling unit or outside the structure constitutes a basic deficiency.

12. Washing Facilities: scored from D5. The lack of a wash basin in the unit (separate from a kitchen sink), or the absence of an installed laundry tub on the premises, is penalized as an index of inconvenience and barrier to normal cleanliness. Penalties range from zero for presence of both facilities to 8 points for absence of both. In rooming units the laundry tub is not required and scoring is based on whether all wash basins have hot water and whether the number of basins bears reasonable relation to the number of occupants.

13. Dual Egress: scored from D6. This item penalizes

¹⁹ Card punching for the location scores of items 1 and 7 permits segregation of rear and basement units for special analysis. In effect these are both qualitative (scoring) and descriptive items.

²⁰ Scores and the specification of basic deficiency may be modified in a community with so-called Russian or Finnish baths of the outdoor communal type.

²¹ Piped hot water means a tap at which hot water can be drawn from a heater; it does not necessarily mean continuous running hot water as supplied in high grade apartment buildings.

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any dwelling unit that lacks two separate safe means of reaching the outdoors at ground level. In case of fire this defect can be the direct cause of deaths. Any dwelling unit showing but a single means of egress is charged with a basic deficiency. Penalty scores range from zero for two means of egress to 30 points for a single means of egress in a unit on the third floor or higher.

The definitions and field instructions for this item are particularly explicit in order to assure reasonable interpretation of dual egress in such types of buildings as the ordinary two-story single-family house with a single stairway. In rooming units, two means of egress must be accessible from every room in order to escape a basic deficiency. Requirements are relaxed in the case of fire-proof structures, though few such buildings will ordinarily be found in low-grade areas subject to survey by this method.

14. Electric Lighting: scored from D7. Lack of installed electricity is penalized on the ground that other forms of artificial lighting seldom provide adequate illumination for close visual tasks and that they will usually involve special fire hazard. Penalties range from zero for electric lighting installed and used to 15 points for no electricity installed. The latter condition is classified as a basic deficiency.

15. Central Heating: scored from D8. The lack of furnace or other central source of heat is given a small penalty on the presumption that stoves or other local heat sources within the rooms of the unit will entail some nuisance in the handling of fuel or removal of ashes. Scores range from zero for central heating installed and used to 3 points for no central heating. No attempt is made in this item to evaluate the adequacy of heating, since local heaters well distributed through the unit can supply entirely adequate heat (see next item).

16. Rooms Lacking Installed Heater: scored from D9. Under this item a penalty score is assigned according to the proportion of rooms in the unit which lack an installed heater (flue-connected stove, radiator, furnace register or other safe permanent heating device).²² This determination, although a relatively crude index of heating adequacy, gives a much stronger basis for penalty scores than the classification merely by central or local type of heating, commonly used in housing surveys. Penalty scores range from zero for all rooms with installed heater to 20 points for all rooms in a large unit lacking installed heater (substantial cookstoves are counted as heaters). The scores cited (and the specification of basic deficiency in the next paragraph) apply to northern regions of the United States; penalty values are decreased in regions with milder climates. Necessary revisions of these scores will be supplied by the consultant.

²² Fireplaces may be included in the list of installed heating devices, or excluded, depending on local conditions.

A basic deficiency is declared only if: a) all rooms of a small unit (one through four rooms) lack installed heater; or b) if three-fourths or more of the rooms in a large unit (five rooms and over) lack such heaters.²³

17. Rooms Lacking Window: scored from D9. This item discloses rooms without a window to the outside air, and acts as a supplement to item 4 on daylight obstruction of the building as a whole. A windowless room is widely recognized as one of the most fundamental defects in housing. Penalty scores range from zero for no windowless room to 30 points for one room without window in a small unit. Rooms with a skylight only are also penalized. In general, if any room of the unit lacks a window a basic deficiency is recorded.

18. Rooms Lacking Closet: scored from D9. The proportion of rooms in the unit which lack a closet (opening directly from the room or adjacent to it) is scored as an index of inconvenience in housekeeping and of poor dwelling design. Scores range from zero, where every room is supplied with a closet, to 8 points where three-fourths or more of the rooms lack this facility. This item is not only diagnostic in its own right but contributes to the general index of room adequacy, discussed below (item 20).

19. Rooms of Substandard Area: scored from D9. The proportion of rooms which fail to meet a reasonable standard of size is the basis for scoring under this item.²⁴ This appraisal is made not as an index of overcrowding but rather as a measure of the unit's adequacy for normal occupancy. The standards for this item have been derived from investigations of the Subcommittee on Occupancy Standards of the Committee on the Hygiene of Housing and from criteria of other national housing bodies. The required area for each type of room is adjusted to the total number of rooms in the unit. For example, in a unit having only one bedroom the area requirement for that room is 120 square feet; whereas in a four-bedroom unit only one bedroom need meet this standard, two should be as large as 100 square feet, and the fourth may be as small as 70 square feet.

Penalty scores range from zero, where no room is of substandard area, to 10 points if three-fourths or more of the rooms fail to meet the area requirement. Even this latter condition is not charged as a basic deficiency, since overcrowding can be avoided by under-occupancy. Over-occupancy in units with small rooms, however, will get stiff penalties (and basic deficiencies are chargeable) for occupancy items 28 and 29, below.

20. Combined Room Facilities: scored from 16-19 above. Under this item the scores for items 16-19 inclusive are totalled as a supplementary score on general

²³ Scoring for this item and for items 17-19 is done from tables on the scoring template which make the allowances needed for smaller and larger units.

²⁴ Room areas are computed in the office from dimensions obtained by standardized pacing—with exact measurement in rooms which show by pacing an area less than 100 square feet.

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adequacy of rooms. This score is not included in the total score, for to do so would give double weight to items 16-19. The penalty for item 20 is recorded on the punch card, however, for analysis.

It is obviously impossible in an appraisal of this type to evaluate the adequacy of room design and the subtle qualities of dwelling space in the way that an architect or home economist could do. The present item has proved useful, however, as an over-all index of room quality in lieu of refined judgment on these intangibles. Well-designed modern dwellings will show low penalty scores, if any, for lack of heaters, windowless rooms, rooms without closets, or rooms of substandard area, whereas buildings which were slapped together at the least possible cost and without thoughtful design will generally reveal this fact by considerable penalty scores for the combination of these items.

The possible total score for item 20 is 68 points, and four classes for this item on the punch card give good discrimination.

MAINTENANCE

Items 21-25 deal with upkeep and sanitary condition of the unit and the structure which contains it. Reporting of sanitary condition and of disrepair has been widely recognized as a difficult problem in housing surveys. Inadequate maintenance can give rise to some of the most intolerable of all housing conditions, but it is hard to design a schedule for maintenance items which will not depend unduly on subjective judgment of enumerators, with highly variable reporting from one field worker to another.

In the present method, the influence of judgment is held to narrow limits by breaking the items down into numerous subitems and by requiring the enumerator to report only the presence or absence of selected conditions which are closely specified in his instructions. He is not asked, for example, to report whether a toilet fixture is clean or dirty, for it has been found that even persons with closely similar background will differ in their judgment on such an apparently simple point. Instead, in this instance, the enumerator reports as index items three things which are known to be generally associated with insanitary toilet conditions: lack of an artificial light in the toilet compartment, lack of an outside window or ventilating duct, and the presence of specific defects in the toilet fixture which put it out of normal working order.

Because some maintenance items give an indirect report of the condition sought, and because in others it is not wholly possible to exclude the element of judgment, all items in the group carry the word *Index* in their titles.

Whereas the facilities and occupancy items will show virtually 100 percent agreement between the reporting of one properly trained enumerator and another, it

must be recognized that individual differences will appear in the reporting for maintenance items, even with clear instructions and conscientious work. Experience with these items indicates that these variations will be held to wholly tolerable limits by the training, supervision and checking procedures specified in other chapters. A further safeguard is the separate subtotal given to scores in this group. If there is reason to question the accuracy of maintenance results they can be subordinated in final interpretation without affecting the other 25 appraisal items or the subtotal scores for facilities and occupancy. Twelve of the 13 basic deficiencies also occur outside the maintenance group.

21. Toilet Condition Index: scored from D2. This item reports conditions inimical to a sanitary condition of the toilet which serves a unit, using the criteria mentioned three paragraphs above. Scores range from zero for no deficiency to 12 points for deficiency on all three index factors.

22. Deterioration Index: scored from S12 and D10. Specific indices of disrepair and physical deterioration are reported for the unit and the containing structure. The Committee has made extensive studies to develop sound indices, for reporting of disrepair has been perhaps the least reliable feature of past housing survey practice. The difficulty has been that the enumerator is usually asked to make a total judgment as to whether the dwelling is in good repair, needs minor or major repairs, or is (by reason of disrepair) unfit for use. These categories are unsatisfactory for use with enumerators who are not skilled building inspectors, and experience in various cities has indicated that different workers will obtain quite different results for similar structures. In one western city, two surveys in one district within a period of two years—during which no striking changes had occurred—showed in one count 1,500 dwellings substandard for disrepair, in the other about 3,000.

To avoid such weakness and variability the Committee has defined specific indices of deterioration, all of which are readily observed in exposed surfaces of a dwelling.

Deterioration is grouped into two broad classes and four specific forms, as follows:

- a) Part or all of the thickness of a surface material is *missing* at one or more places;
 - 1) *Hole* through the entire thickness of the surface;
 - 2) *Surface worn*, but without hole through;
- b) Substantially all of the thickness of the surface material is *present*, but the material has *shifted* from its normal position;
 - 3) *Surface broken*: cracked through its entire thickness, with separation of the broken parts;
 - 4) *Surface loose*: deformed, warped, bulged, settled, swollen, separated (but not broken), shrunken, shaky underfoot, out of level, or out of plumb.

MAINTENANCE AND OCCUPANCY ITEMS

The common types of deterioration, including holes in walls or floors, worn or broken steps, weathering of masonry, broken windows, etc., are readily classified under these four headings, regardless of the materials and method of construction. Photographs in Appendix B-4, supplied for training and field reference of the inspector, show the ease of identification once the nature of deterioration has been logically classified.

The four *forms* of deterioration are classified into *types* according to the part of the dwelling affected and the severity (usually the depth) of the deterioration. A type of deterioration is classified into *degrees* (0,1,2) by the extent of the deteriorated surface.

Elements of the structural shell (walls, floors and ceiling) are reported separately from stairs and windows, and certain appendages of a structure are ignored. Each condition reported is taken in terms of its type and the highest degree to which it occurs in the unit or structure. Scores are assigned according to the degrees of the field entries.

Each unit carries a score for deterioration within it, and also the score of the containing structure. Scores range from zero for absence of significant deterioration (degree 0 throughout) to a maximum of 50 points—25 points each for unit and structure—where both show degree 2 deterioration for several of the index conditions.

A basic deficiency is declared for a score of 15 points or over; the usual level of 10 points has been raised here to prevent declaration of a basic deficiency for minor scores on several forms of deterioration.

Tests have shown that the scores will give an accurate classification over the range from buildings in good repair to those in extreme disrepair as judged by an experienced building inspector, and that closely similar scores will result from inspection of the same dwelling by different workers.

While deterioration is readily classified into definite types and degrees, mastery of the item requires understanding of numerous subordinate principles and of varying relationships between the parts of a structure. The full explanation and instructions are therefore quite detailed. The item will require more training time and supervision in the early stages of field work than any other on the schedules if the consistent results possible are to be attained.

It is better to omit the deterioration item than to enumerate it if time must be skimmed or the field crew is of generally inferior ability. Reporting of deterioration has been omitted in two test studies where it was necessary to cut corners, but despite the lack of information to repair the results were adequate for many purposes.

23. Infestation Index: scored from S13 and D11. Primary emphasis is put on rat infestation, considered to occur when rats are observed or specific evidence of their presence is found. Other vermin are given only token

scores unless special local emphasis is desired.

Standard scores range from zero for no evidence of infestation to 15 points for a unit showing both rat and other infestation. Scores for this item may want adjustment in light of local conditions. Infestation is not carried as a basic deficiency because the accuracy of observation can be debated.

24. Sanitary Index: scored from S14 and D12. Conditions scored for the structure are those ordinarily encountered in the yard—accumulation of garbage and other refuse, and defective refuse containers. For the unit they include six indices of insanitary conditions or specific safety hazard: plumbing leakage; plumbing stoppage; low water pressure; damp walls, ceilings or floors; hazardous heaters and hazardous electric wiring. Because the threshold of reportability for some conditions cannot be exactly specified, the scores for components of this item are kept small and no basic deficiency is declared. A maximum of 30 points for structure and unit deficiencies can, however, be incurred, and scores within this range give sharp indication of premises well or poorly kept from the sanitary and safety viewpoints.

25. Basement Condition Index: scored from S15. Here the unit participates in the score of its structure, and the indices are leakage or backflooding, specific hazards in basement stairs, and accumulation of combustible material. The maximum score is 13 points where all three deficiencies are observed.

OCCUPANCY

Housing surveys have commonly dealt with crowding of dwellings through the single index of number of persons per room. This figure, while basic, fails to reflect either the size of rooms or their type of use. With variation in either or both of these characteristics, a given number of persons per room can take on quite different meanings. Determination of persons per room is of course retained by the present method, and in a form which gives comparability with findings of the Housing Census and other standard surveys. To it are added three other indices which permit much more refined conclusions as to the nature of overcrowding: persons per sleeping room, area per person of sleeping rooms, and area per person of rooms (if any) not used for sleeping. The sharpness of findings under this scheme was brought out in Part I (page 29) in the discussion of overcrowding in a public housing project.

Cubic space, the basis of most legal requirements for occupancy, has been abandoned here, and floor area is used as the criterion of adequacy. The old-line cubage concept is based on the idea that infiltration of air into buildings (and thus the adequacy of ventilation) will vary with the cubage. Rudimentary analysis of published ventilation data suffices to show that this is by no means the case. Infiltration in the ordinary house is

governed not by cubage but by perimeter of window and door openings. On any other grounds than ventilation, floor area is obviously superior as the test of space adequacy, as it is floor space on which one walks and places furniture. By what magic does a 10 x 12 foot room have a capacity (as it does under numerous legal codes) of two persons if the ceiling is nine feet high, but three persons with a ten-foot ceiling?

26. *Persons per Room: scored from D9 and D13.*²⁵ As noted above, this crude though fundamental item gives comparability between the present appraisal method and customary survey findings. The number of occupants of the unit is divided by the number of habitable rooms. Scores range from zero for one person or less per room to 30 points for four or more persons per room; a basic deficiency is declared for more than 1.5 persons per room.

27. *Persons per Sleeping Room: scored from D9 and D13.* Each room used for sleeping under the given occupancy of the unit is counted as a sleeping room for purposes of this item, even though it may be furnished and reported as a living room or other nonbedroom. The total number of occupants is divided by the number of such sleeping rooms. Scores range from zero for two persons or less per sleeping room to 25 points for four or more persons.

Basic deficiency is declared when the number of persons equals or exceeds two times the number of sleeping rooms plus 2: in other words, where three persons are sleeping in each of at least two sleeping rooms. A penalty of 5 points is assigned for the undesirable but tolerable condition of three persons sleeping in one room only, as in the case of parents with infant sharing the principal bedroom. These scoring practices are designed to accord with the occupancy regulations of local housing authorities.

28. *Sleeping Area per Person: scored from D9 and D13.* Rooms are classified by the office entries for item D9 into sleeping and nonsleeping rooms, and the room areas in each group are totalled. Dividing the total sleeping area by the number of occupants gives a measure of bedroom crowding—the form of crowding most intimately associated with spread of disease. Scores range from zero for 60 square feet or more per person to 30 points for less than 25 square feet per person, with 10 points and basic deficiency for less than 40 square feet. Card punching also segregates cases with less than 50 square feet per person—the standard of some laws and ordinances.

This item provides an essential supplement to the two previous items. The total penalty for crowding will be moderated where sleeping rooms are uncommonly

²⁵ This item is not applicable to rooming units, for which the room crowding score is based on persons per sleeping room, item 27. Since that item is the only index of room crowding in rooming units, it carries a heavier penalty scale than used for dwelling units.

large, and (what is more usual) will be intensified where over-occupancy occurs in rooms of normal or inadequate area for customary occupancy. Room dimensions are not difficult to obtain, but even if they were they would be justified by the relatively great refinement they give to occupancy evaluations.

29. *Nonsleeping Area per Person: scored from D9 and D13.*²⁶ This item considers the area of rooms (if any) not regularly used for sleeping under current occupancy of the unit. The total area of nonsleeping rooms is divided by the number of occupants, to measure the adequacy of space available for normal living purposes. This is a new concept in extensive housing surveys, and one which it is hoped will gain wider recognition. By any decent standard, a dwelling is grossly deficient in which no room can be used for general purposes after most members of the household have retired (except of course, a one room unit, for which allowance is made under this item).

Scores are based on a sliding scale, with adjustment for small households. To earn the score of zero, 210 square feet of nonsleeping area is required (as would occur in a living room and small kitchen) for a four person household, with an increment of 10 square feet for each additional person. Space in a kitchen not used for sleeping is counted toward the total, though alone it will not usually satisfy the requirement. The maximum score of 25 points is given for less than 50 percent of the standard requirement. Though this item is considered of fundamental importance, no basic deficiency is declared because of its newness.

Items 28 and 29 interact with great effectiveness. Where all rooms of a unit are used as bedrooms, the penalty for sleeping area per person will be reduced, but at the cost of a penalty score for lack of normal living space. Conversely, if living space is gained at the expense of crowding the bedrooms, this will be clearly shown in the scores for these two items.

30. *Doubling of Basic Families: scored from D13.*²⁷ Occupancy of a dwelling unit by two or more families of such composition that they would normally live alone is penalized, though not severely, since voluntary and involuntary doubling cannot be distinguished. A score of 8 points is given where two families live together, 10 points for three or more families in one unit.

4. Relation to Basic Principles of Healthful Housing

In the early stages of developing these procedures it was expected that many of the Committee's Basic Principles of Healthful Housing must go unrepresented in an appraisal such as this, designed for extensive surveys with nontechnical observers. The mere listing of these principles, given in Figure 3, shows that it would be

²⁶ Not applicable to rooming units.

²⁷ Not applicable to rooming units.

A SUMMARY GROUPING OF ITEMS AND SCORES

impossible to determine fully the extent of conformity to them without elaborate study in each dwelling. Accurate instrumental studies of heating conditions alone, conducted by the Committee in about 60 dwellings, occupied the full time of one staff member for three winters.

While some of the appraisal items discussed above are thus of necessity indices only, most give relatively sharp direct measurement of the condition which it is sought to appraise. It is a source of gratification that the schedules as finally evolved supply indices or some degree of direct appraisal for 27 of the 30 Basic Principles—when both the dwelling and environmental surveys are taken into account. The only principles for which some index is not provided are two that deal with intangibles (Principle 14, on provision for esthetic satisfaction; and 15, on concordance with prevailing social standards), and one (17) on the complex problem of plumbing cross-connections and back siphonage. The reader will find in the discussion of appraisal items above and in the

corresponding sections of Part III some check on the attainment of every other Basic Principle.²⁸

5. A Summary Grouping of Items and Scores

Deficiency items were considered individually in Section 3, and in the sequence occurring on the appraisal form. While the items are classified by the appraisal form into logical main groupings of facilities, maintenance and occupancy, the sequence of items within each group is determined by interlocking mechanical requirements of the field schedules and office operations. Items therefore do not always appear in related sequence, and it was not possible in Section 3 to bring out certain interrelations among them.

These relations are suggested by Figure 4, in which the 30 appraisal items are condensed into 14 subgroups to emphasize their practical significance. Shown at the right of the table are the numbers of related items and the combined maximum score for each group.

FIGURE 3. BASIC PRINCIPLES OF HEALTHFUL HOUSING²⁹

A. Fundamental Physiological Needs

1. Maintenance of a thermal environment which will avoid undue heat loss from the human body
2. Maintenance of a thermal environment which will permit adequate heat loss from the human body
3. Provision of an atmosphere of reasonable chemical purity
4. Provision of adequate daylight illumination and avoidance of undue daylight glare
5. Provision for admission of direct sunlight
6. Provision of adequate artificial illumination and avoidance of glare
7. Protection against excessive noise
8. Provision of adequate space for exercise and for the play of children

B. Fundamental Psychological Needs

9. Provision of adequate privacy for the individual
10. Provision of opportunities for normal family life
11. Provision of opportunities for normal community life
12. Provision of facilities which make possible the performance of the tasks of the household without undue physical and mental fatigue
13. Provision of facilities for maintenance of cleanliness of the dwelling and of the person
14. Provision of possibilities for esthetic satisfaction in the home and its surroundings
15. Concordance with prevailing social standards of the local community

²⁸ The Basic Principles report, being addressed primarily to the construction of new dwellings, was not concerned with problems of deterioration in existing structures; Principle 24 (substantial construction of the dwelling) is therefore represented by the analogous Deterioration Index item of these procedures.

C. Protection Against Contagion

16. Provision of a water supply of safe sanitary quality, available to the dwelling
17. Protection of the water supply system against pollution within the dwelling
18. Provision of toilet facilities of such a character as to minimize the danger of transmitting disease
19. Protection against sewage contamination of the interior surfaces of the dwelling
20. Avoidance of insanitary conditions in the vicinity of the dwelling
21. Exclusion from the dwelling of vermin which may play a part in the transmission of disease
22. Provision of facilities for keeping milk and food undecomposed
23. Provision of sufficient space in sleeping-rooms to minimize the danger of contact infection

D. Protection Against Accidents

24. Erection of the dwelling with such materials and methods of construction as to minimize danger of accidents due to collapse of any part of the structure
25. Control of conditions likely to cause fires or to promote their spread
26. Provision of adequate facilities for escape in case of fire
27. Protection against danger of electrical shocks and burns
28. Protection against gas poisonings
29. Protection against falls and other mechanical injuries in the home
30. Protection of the neighborhood against the hazards of automobile traffic

²⁹ Committee on the Hygiene of Housing: *Basic Principles of Healthful Housing*, New York, American Public Health Association, 2d edition, 1939, 31 pp.

THE RATING SYSTEM AND APPRAISAL ITEMS

Attention is called to the scoring force which is marshalled behind the appraisal of fundamentals in safety and sanitation. Who will challenge assignment of the highest group score to means of egress, where deficiencies too frequently are the direct cause of death? The scores, only slightly lower, attaching to the groups for disposal of excrement and adequacy of water supply are equally representative of their true importance. Other sanitary conditions, repair and lighting are also strongly

represented; and the two principal forms of overcrowding carry together a higher score than any single group of items.

It has been pointed out in Section 1 why few of the maximum scores will usually occur together, and that the grand total of 600 points has never been approached. The group scores of Figure 4 can be taken, however, as a test of balanced schedule content and of a rating scale without caprice.

FIGURE 4. A SUMMARY GROUPING OF APPRAISAL ITEMS AND SCORES

A. Facilities	ITEM NUMBER ^a		MAXIMUM SCORE		B. Maintenance	ITEM NUMBER ^a		MAXIMUM SCORE
	Structure	Unit				Structure	Unit	
Egress and circulation	1, 5	7, 13	74		Sanitary, safety and fire hazards: general	24, 25	21, 24	55
Toilet facilities and sewage disposal	3	9	70		Deterioration and disrepair	22	22	50
Water supply, bathing and washing facilities	2	10, 11, 12	68		Infestation	23	23	15
Natural light and ventilation	4, 6	17	58		<i>Subtotal</i>			120
Artificial lighting	6	14	25					
Kitchen and food preservation facilities	—	8	24		C. Occupancy			
Heating facilities	—	15, 16	23		Room crowding	—	26, 27	55
Indices of room design	—	18, 19	18 ^b		Area crowding	—	28, 29	55
<i>Subtotal</i>			360		Doubling of families	—	30	10
					<i>Subtotal</i>			120
					TOTAL			600

^a Numbers are those given in Figure 1.

^b This score includes only the two items (closets and room area) not chargeable to a group above. As available in actual analysis,

the index of room facilities (appraisal form item 20) represents also the scores for room heating and windowless rooms (items 16 and 17), and the maximum score for that item is 68 points.

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Chapter III

COLLECTION OF DATA

1. Scope of Work

The fundamental operation of data collection is enumeration of dwelling schedules by inspectors. The clerks, in servicing this operation, issue assignments (selecting sample dwellings if necessary), receive completed schedules, and check them for conformity with the assignment and for completeness and internal consistency. A small proportion of dwellings is designated for independent reinspection as a field check on accuracy of inspectors' work. Serial numbers are then assigned to schedules, after which they are ready for processing.

2. Primary Materials

THE DWELLING SCHEDULES: GENERAL DESCRIPTION

All dwelling information is obtained as original data in the field, using the Structure, Dwelling Unit and Rooming Unit Schedules, shown in Figures 5-7.

A Structure Schedule is completed for each residential building, together with as many Unit Schedules as there are dwelling or rooming units in the structure. Thus the field report for a one-family house would consist of one Structure Schedule plus one Dwelling Unit Schedule. For a twelve-family apartment one Structure Schedule and twelve Dwelling Unit Schedules would be returned. Under this practice, variable factors for each unit, such as differences in occupancy or maintenance, are accurately reported without duplicate field entries for the structure as a whole.

The field schedules are designed primarily for clarity and speed in data collection and processing. As indicated in the completed specimens which follow, the usual entry is an X in a box or tabular entry space. Numerical or other written entries are reduced to a minimum.

The schedules call for an affirmative entry in each item. Where a condition or facility does not exist, the item is not left blank but a cancelling entry is made. This practice guards against overlooking any item in the field and simplifies checking in the office.

Factors which may readily be omitted from the appraisal for economy or in response to local conditions

are grouped together in the Structure and Dwelling Unit Schedules as supplementary items.

Since the body content of each schedule is fixed in relation to a scoring template, provision is made for overprinting a limited number of supplementary local items in the Remarks spaces of the schedules.

The schedules and other forms are supplied from plates in which the heading material can be varied to show the location of the study and name of the sponsoring agency. Schedules used for illustration in this volume are taken from a study in progress at the time of writing.

The schedules are seldom referred to after scoring has been done, since the appraisal form and punch card summarize the schedule information and translate it into more convenient form for analysis and interpretation. It is therefore not the purpose of the schedules to give a readily understandable picture of conditions in any dwelling. In fact, certain appraisal items such as overcrowding do not even appear on the schedules. These items are rated by processing the schedule entries through the scoring template onto the appraisal form, as described in Chapter IV.

STRUCTURE SCHEDULE

This schedule, shown in Figure 5, is printed on a sheet 11 x 17 inches, folded to 8½ x 11 inches. Thus the schedule itself provides a convenient folder for filing the Unit Schedules pertaining to it. The back page of this folder can be used, if desired, to carry a record of legal violations found in the structure and of correction orders issued or other action taken.³⁰

The schedule heading provides for recording the name and address of the owner or agent of the property if the appraisal is coordinated with enforcement. The space provided for assignment numbers is not used except in sampling studies. Serial numbers are assigned in the office after enumeration.

Items S1 through S6 give descriptive information only, and are not scored. Items S7 through S16 are

³⁰ Photographs of conditions found in typical dwellings can also be mounted on the blank portions of their Structure Schedules, if desired.

Assignment
No. _____

DWELLING SURVEY
WASHINGTON HOUSING ASSOCIATION, WASHINGTON, D. C.

Serial No. S _____

STRUCTURE SCHEDULE

Address 1253 Alpha Street District No. 2 Block No. 17 Structure No. _____
Owner or Agent Omega Realty Co. Not Available for Occupancy ☐

<p>S1 NUMBER OF UNITS</p> <table border="0"><tr><td>Dwelling units</td><td><u>3</u></td><td><u>—</u></td></tr><tr><td>Rooming units</td><td><u>—</u></td><td><u>—</u></td></tr><tr><td>Business units</td><td><u>—</u></td><td><u>—</u></td></tr></table> <p>S2 NUMBER OF STORIES</p> <table border="0"><tr><td>Total</td><td><u>3</u></td><td><u>—</u></td></tr><tr><td>Wood</td><td><u>—</u></td><td><u>—</u></td></tr><tr><td>Other</td><td><u>—</u></td><td><u>—</u></td></tr></table> <p>S3 EXTERIOR WALLS</p> <table border="0"><tr><td>Attached</td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>Detached</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr></table> <p>S4 STRUCTURE TYPE</p> <table border="0"><tr><td>Street</td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>Rear Yard</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>Alley</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr></table> <p>S5 NUMBER OF TOILETS AND BATHS</p> <table border="0"><tr><td>Toilets</td><td><u>2</u></td><td><u>—</u></td></tr><tr><td>Baths</td><td><u>—</u></td><td><u>—</u></td></tr></table> <p>S6 LIVING UNIT IN BASEMENT</p> <table border="0"><tr><td>Yes</td><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr><tr><td>No</td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td></tr></table> <p>S7 MAIN ACCESS</p> <table border="0"><tr><td>Public</td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>Private</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>None</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr></table> <p>S8 WATER SUPPLY</p> <table border="0"><tr><td>Public</td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>Private</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>None</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr></table> <p>S9 SEWER CONNECTION</p> <table border="0"><tr><td>Public</td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>Private</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>None</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr></table> <p>SUPPLEMENTARY APPRAISAL</p> <p>S8a WATER SUPPLY</p> <table border="0"><tr><td>Nonpublic water supply acceptable to Health Dept.</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr></table> <p>S9a SEWER CONNECTION</p> <table border="0"><tr><td>Nonpublic sewage disposal acceptable to Health Dept.</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr></table> <p>S16a DAYLIGHT OBSTRUCTION</p> <table border="1" style="width: 100%;"><thead><tr><th rowspan="2">Side</th><th colspan="4">Adjacent Structure</th></tr><tr><th>No. of Windows</th><th>Height in Stories</th><th>Distance in Feet</th><th>Horiz. Obstr.</th></tr><tr><th></th><th>a</th><th>b</th><th>c</th><th>d</th></tr></thead><tbody><tr><td>Front</td><td></td><td></td><td></td><td></td></tr><tr><td>Left</td><td></td><td></td><td></td><td></td></tr><tr><td>Right</td><td></td><td></td><td></td><td></td></tr><tr><td>Rear</td><td></td><td></td><td></td><td></td></tr></tbody></table>	Dwelling units	<u>3</u>	<u>—</u>	Rooming units	<u>—</u>	<u>—</u>	Business units	<u>—</u>	<u>—</u>	Total	<u>3</u>	<u>—</u>	Wood	<u>—</u>	<u>—</u>	Other	<u>—</u>	<u>—</u>	Attached	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Detached	<input type="checkbox"/>	<input type="checkbox"/>	Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Rear Yard	<input type="checkbox"/>	<input type="checkbox"/>	Alley	<input type="checkbox"/>	<input type="checkbox"/>	Toilets	<u>2</u>	<u>—</u>	Baths	<u>—</u>	<u>—</u>	Yes	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Public	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Private	<input type="checkbox"/>	<input type="checkbox"/>	None	<input type="checkbox"/>	<input type="checkbox"/>	Public	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Private	<input type="checkbox"/>	<input type="checkbox"/>	None	<input type="checkbox"/>	<input type="checkbox"/>	Public	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Private	<input type="checkbox"/>	<input type="checkbox"/>	None	<input type="checkbox"/>	<input type="checkbox"/>	Nonpublic water supply acceptable to Health Dept.	<input type="checkbox"/>	<input type="checkbox"/>	Nonpublic sewage disposal acceptable to Health Dept.	<input type="checkbox"/>	<input type="checkbox"/>	Side	Adjacent Structure				No. of Windows	Height in Stories	Distance in Feet	Horiz. Obstr.		a	b	c	d	Front					Left					Right					Rear					<p>S10 STAIRS AND FIRE ESCAPES (for two-story tenements and all structures of three or more stories)</p> <p><input type="checkbox"/> Item Not Applicable</p> <table border="0"><thead><tr><th></th><th>Front Stairway</th><th>Rear Stairway</th><th>Outside Fire Escapes</th></tr><tr><th></th><th>None</th><th>None</th><th>None</th></tr><tr><th></th><th>Yes</th><th>Yes</th><th>Yes</th></tr><tr><th></th><th>No</th><th>No</th><th>No</th></tr></thead><tbody><tr><td>Free from obstruction</td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr><tr><td>Clear egress at ground level</td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr><tr><td>Fireproof construction throughout</td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr><tr><td>Free from vertical ladders above first story</td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr></tbody></table> <p>S11 PUBLIC HALL LIGHTING</p> <p><input type="checkbox"/> No Public Hall</p> <table border="0"><tr><td>Daytime lighting deficient</td><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>Halls lacking light fixtures</td><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td></tr></table> <p>S12 DETERIORATION INDEX</p> <table border="0"><thead><tr><th></th><th>Deg. 0</th><th>Deg. 1</th><th>Deg. 2</th></tr></thead><tbody><tr><td>Inside Stairs</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr><tr><td>Steps deteriorated</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr><tr><td>Rails deteriorated</td><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>Public Hall Walls, Ceilings</td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>Hole or surface worn</td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>Surface broken or loose</td><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>Public Hall or Porch Floors</td><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>Hole or surface worn</td><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>Surface broken or loose</td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr></tbody></table> <p>S13 INFESTATION INDEX</p> <table border="0"><thead><tr><th></th><th>Not Evid.</th><th>Re-pld.</th><th>Obs.</th></tr></thead><tbody><tr><td>Rats in structure or yard</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr><tr><td>Other vermin</td><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td></tr></tbody></table> <p>S14 SANITARY INDEX</p> <table border="0"><thead><tr><th></th><th>No</th><th>Yes</th><th>Ext.</th></tr></thead><tbody><tr><td>Refuse containers defective</td><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>Garbage accumulated</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr><tr><td>Other refuse accumulated</td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr></tbody></table> <p>S12 DETERIORATION INDEX</p> <table border="0"><thead><tr><th></th><th>Deg. 0</th><th>Deg. 1</th><th>Deg. 2</th></tr></thead><tbody><tr><td>Outside Stairs</td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>Steps deteriorated</td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>Rails deteriorated</td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>Outside Walls</td><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>Hole or surface worn</td><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>Surface broken or loose</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input checked="" type="checkbox"/></td></tr></tbody></table> <p>S15 BASEMENT CONDITION INDEX</p> <table border="0"><tr><td><input checked="" type="checkbox"/> No Basement</td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>Leakage or backflooding</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>Stairs hazardous</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr><tr><td>Combustibles accumulated</td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr></table> <p>S16 DAYLIGHT OBSTRUCTION</p> <table border="0"><thead><tr><th></th><th>No</th><th>Yes</th><th>Ext.</th></tr></thead><tbody><tr><td>Condition warranting supplementary appraisal</td><td><input checked="" type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr></tbody></table>		Front Stairway	Rear Stairway	Outside Fire Escapes		None	None	None		Yes	Yes	Yes		No	No	No	Free from obstruction	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Clear egress at ground level	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Fireproof construction throughout	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Free from vertical ladders above first story	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Daytime lighting deficient	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Halls lacking light fixtures	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		Deg. 0	Deg. 1	Deg. 2	Inside Stairs	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Steps deteriorated	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Rails deteriorated	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Public Hall Walls, Ceilings	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Hole or surface worn	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Surface broken or loose	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Public Hall or Porch Floors	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Hole or surface worn	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Surface broken or loose	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Not Evid.	Re-pld.	Obs.	Rats in structure or yard	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Other vermin	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		No	Yes	Ext.	Refuse containers defective	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Garbage accumulated	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Other refuse accumulated	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Deg. 0	Deg. 1	Deg. 2	Outside Stairs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Steps deteriorated	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Rails deteriorated	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Outside Walls	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Hole or surface worn	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Surface broken or loose	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> No Basement	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Leakage or backflooding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Stairs hazardous	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Combustibles accumulated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		No	Yes	Ext.	Condition warranting supplementary appraisal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dwelling units	<u>3</u>	<u>—</u>																																																																																																																																																																																																																																																																															
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Detached	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																																																																																																																																																																																															
Street	<input checked="" type="checkbox"/>	<input type="checkbox"/>																																																																																																																																																																																																																																																																															
Rear Yard	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																																																																																																																																																																																															
Alley	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																																																																																																																																																																																															
Toilets	<u>2</u>	<u>—</u>																																																																																																																																																																																																																																																																															
Baths	<u>—</u>	<u>—</u>																																																																																																																																																																																																																																																																															
Yes	<input type="checkbox"/>	<input checked="" type="checkbox"/>																																																																																																																																																																																																																																																																															
No	<input checked="" type="checkbox"/>	<input type="checkbox"/>																																																																																																																																																																																																																																																																															
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None	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																																																																																																																																																																																															
Nonpublic water supply acceptable to Health Dept.	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																																																																																																																																																																																															
Nonpublic sewage disposal acceptable to Health Dept.	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																																																																																																																																																																																															
Side	Adjacent Structure																																																																																																																																																																																																																																																																																
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	No	No	No																																																																																																																																																																																																																																																																														
Free from obstruction	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>																																																																																																																																																																																																																																																																														
Clear egress at ground level	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>																																																																																																																																																																																																																																																																														
Fireproof construction throughout	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>																																																																																																																																																																																																																																																																														
Free from vertical ladders above first story	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>																																																																																																																																																																																																																																																																														
Daytime lighting deficient	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>																																																																																																																																																																																																																																																																														
Halls lacking light fixtures	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>																																																																																																																																																																																																																																																																														
	Deg. 0	Deg. 1	Deg. 2																																																																																																																																																																																																																																																																														
Inside Stairs	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>																																																																																																																																																																																																																																																																														
Steps deteriorated	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>																																																																																																																																																																																																																																																																														
Rails deteriorated	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>																																																																																																																																																																																																																																																																														
Public Hall Walls, Ceilings	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																																																																																																																																																																																														
Hole or surface worn	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																																																																																																																																																																																														
Surface broken or loose	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>																																																																																																																																																																																																																																																																														
Public Hall or Porch Floors	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>																																																																																																																																																																																																																																																																														
Hole or surface worn	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>																																																																																																																																																																																																																																																																														
Surface broken or loose	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																																																																																																																																																																																														
	Not Evid.	Re-pld.	Obs.																																																																																																																																																																																																																																																																														
Rats in structure or yard	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>																																																																																																																																																																																																																																																																														
Other vermin	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>																																																																																																																																																																																																																																																																														
	No	Yes	Ext.																																																																																																																																																																																																																																																																														
Refuse containers defective	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>																																																																																																																																																																																																																																																																														
Garbage accumulated	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>																																																																																																																																																																																																																																																																														
Other refuse accumulated	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																																																																																																																																																																																														
	Deg. 0	Deg. 1	Deg. 2																																																																																																																																																																																																																																																																														
Outside Stairs	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																																																																																																																																																																																														
Steps deteriorated	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																																																																																																																																																																																														
Rails deteriorated	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																																																																																																																																																																																														
Outside Walls	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>																																																																																																																																																																																																																																																																														
Hole or surface worn	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>																																																																																																																																																																																																																																																																														
Surface broken or loose	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>																																																																																																																																																																																																																																																																														
<input checked="" type="checkbox"/> No Basement	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																																																																																																																																																																																														
Leakage or backflooding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																																																																																																																																																																																														
Stairs hazardous	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																																																																																																																																																																																														
Combustibles accumulated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																																																																																																																																																																																														
	No	Yes	Ext.																																																																																																																																																																																																																																																																														
Condition warranting supplementary appraisal	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																																																																																																																																																																																																																																																																														

(office entries)

Obstruction Factor: Total h/Total e

Side	Adj. a	Table	f x d	e x g
	e	f	g	h
Front				
Left				
Right				
Rear				

Total e _____ Total h _____

REMARKS (refer to items by number)

No Yes

W Foundation Lacking ☐ ☒

Inspected by R. L. S. Date 3/16/45
Time begun 2:40 Time finished 3:20 Total time 0:40
Office check _____ Field check _____

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FIGURE 5. STRUCTURE SCHEDULE WITH FIELD ENTRIES

OPTIONS IN USE OF SCHEDULES

appraisal (scoring) items.³¹ S12 is carried in two columns of the schedule to separate interior observations of disrepair from those made outside the structure.

Item S16 serves to screen out those structures with serious daylight impairment by adjacent structures, in order that the relatively elaborate entries of supplementary item S16a may be restricted to the minimum number of buildings. Reporting of items S16 and S16a can be omitted in localities where daylight obstruction is not characteristic, with appreciable savings in field and office time.

Items S8a and S9a, nonpublic water supply and sewage disposal, are ordinarily not applicable in central urban areas.

Terms appearing on the schedule are defined, item by item, in the Field Procedures, Appendix B.

Terms of which the abbreviations in italics may not be fully self-explanatory are: Nonresidential (item S2); Extreme (S11, S14, S16); Degree (S12); Evident, Reported, Observed (S13, S15) and Horizontal Obstruction (S16a).

Figure 5 illustrates the overprinting of local items (designated by letters in the series w, x, y, z) in the Remarks space of the schedule.

The foot of the Structure Schedule provides for recording the time spent in inspecting a structure and its dwelling units. This is usually desirable at least in some stages of a study for purposes of cost control.

DWELLING UNIT SCHEDULE

In this form (Figure 6) the descriptive (non-scoring) information includes the heading entries and items D13 through D16. Supplementary item D13a provides for reporting the ages and relationships of all individuals in the household, together with the income of each earner.

Item D13b provides for calculation of total family income from the field entries of D13a, and D16a permits analysis, if desired, on the basis of rent per room per month—a more revealing figure than the total rent of D16.

Items D1 through D12 give scoring information. Characteristics of a unit up to twelve rooms can be reported in item D9; if a larger unit is encountered a second schedule is used to enumerate the room facilities.

Terms appearing on the schedule are defined, item by item, in the Field Procedures, Appendix B.

Abbreviated terms not previously explained are: Inside, Outside, Structure, Available (D2, D3, D4); Water Closet, Standard (D2); Installed (D9); Building Employee (D15); Furnishings (D16); Relationship, Week, Month (D13a).

ROOMING UNIT SCHEDULE

This is a variant of the Dwelling Unit Schedule,

³¹ The significance of all scoring items is discussed in Chapter II.

adapted to the special characteristics of rooming houses, and shown in Figure 7. It does not require a special scoring template, appraisal form or punch card. Certain special readings on the template are required, however; as a reminder of this the Rooming Unit Schedule is printed on a buff or other light colored paper stock to distinguish it from the Dwelling Unit Schedule.

The principal changes from the Dwelling Unit Schedule are: modification of the room facilities item; omission of family income data; and replacement of the kitchen facilities item, not pertinent to rooming houses, by an item to be used chiefly for defects of local significance.³²

It should be noted that so-called light housekeeping rooms, often found in rooming houses, will be reported not on the Rooming Unit Schedule but on Dwelling Unit Schedules. The crux of this matter is the presence or absence of facilities for regular cooking. Where these are used, it is assumed that family life is being conducted, and the more refined appraisal of the Dwelling Unit Schedule (with its sensitive scores for overcrowding and sharing of sanitary facilities) is appropriate.

The field report for a rooming house may thus consist of the Structure Schedule, a Rooming Unit Schedule for non-housekeeping rooms, and one or several Dwelling Unit Schedules for housekeeping rooms or suites.

The Rooming Unit Schedule can be used for various types of rooming houses, ranging from the small operation in an ordinary house to the large commercial rooming house or hotel. It is not designed, however, for use in so-called flop houses or similar lodging space without individual sleeping rooms.

3. Options in Use of Schedules

The schedules offer several choices on the treatment of special information, some of which may affect the organization or cost of the study or the usefulness of the results. Consideration of the following questions in advance of the consulting period will expedite final decisions at that time.

SHOULD ROOMING UNITS BE ENUMERATED?

The Rooming Unit Schedule will of course be used in districts where the concentration of poor rooming houses is a major reason for the study. This schedule, however, requires special instructions for both the field and office staffs, and rooming unit data call for special tabulations. Large rooming houses will require considerably more field time than typical family dwelling units.

The time estimates given in Part I are based on studies of nonrooming house districts, and for districts made

³² Kitchen facilities of a boarding house might, with inspectors competent to evaluate such factors, be appraised under a supplementary local item.

DWELLING SURVEY
WASHINGTON HOUSING ASSOCIATION, WASHINGTON, D. C.

DWELLING UNIT SCHEDULE

Inspection No. 2 Address 1253 Alpha Street District No. 2 Block No. 17 Structure No.
 Floor 3^d Part of Floor All Unit No. Vacant ☐

D1 KITCHEN FACILITIES Yes No
 Installed sink ☒ ☐
 Installed range (gas, electric, oil, coal, wood) ☒ ☐
 Refrigerator (mechanical, ice) ☒ ☐
 Facilities private to unit ☒ ☐

D2 TOILET Ins. Unit Outs. Unit Outs. Struc. None Avail.
 Location ☐ ☒ ☐ ☐
Flush W.C. Std. Privy Other Privy Flush Hopper
 Type ☒ ☐ ☐ ☐
Private Shared Total Units Sharing
 Sharing ☐ ☒ ☐ 2

Condition Index Yes No
 Toilet in working order ☒ ☐
 Artificial light ☐ ☒
 Outside window or duct ☒ ☐

D3 BATH Ins. Unit Outs. Unit Outs. Struc. None Avail.
 Location ☐ ☐ ☐ ☒
Hot Tub Hot. Shower Cold Tub Cold Shower
 Type ☐ ☐ ☐ ☐
Private Shared Total Units Sharing
 Sharing ☐ ☐ ☐

D4 WATER SUPPLY Ins. Hot Ins. Cold Outs. Unit Outs. Struc.
☐ ☒ ☐ ☐

D5 WASHING FACILITIES Yes No
 Wash basin in unit ☐ ☒
 Laundry tub available ☐ ☒

D6 DUAL EGRESS Yes No
☒ ☐

D7 ELECTRIC LIGHTING Yes Not Used None
☒ ☐ ☐

D8 CENTRAL HEATING Yes Not Used None
☐ ☐ ☒

REMARKS (refer to items by number)

X Immigrant Family No Yes
☒ ☐

D9 ROOM FACILITIES

		TOTAL NUMBER OF ROOMS IN UNIT <u>5</u>										
		Kitchen	Liv. Room	Din. Room	Bedrooms						Other	Total
					1	2	3	4	5	6		ENTER ABOVE
Rooms in unit	(x)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					<u>5</u>
Bed capacity (persons)	(x)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					<u>4</u>
Lacking inst. heater	(x)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					<u>3</u>
Lacking window	(x)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					<u>1</u>
Lacking closet	(x)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					<u>1</u>
Dimensions (ft.)		<u>11/15</u>	<u>12/15</u>	<u>10/12</u>	<u>10/10</u>	<u>7/10</u>						<u>3</u>
AREA SUB-STANDARD												
(office entries)												<u>3</u>
Sleeping rooms	(x)			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						<u>290</u>
Area: sleeping	(ft.)			<u>120</u>	<u>100</u>	<u>70</u>						<u>345</u>
Area: nonsleeping	(ft.)	<u>165</u>	<u>180</u>									<u>ENTER ABOVE</u>
Area: substandard	(x)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>									<u>1</u>

D10 DETERIORATION INDEX Deg. 0 Deg. 1 Deg. 2
 Walls and Ceilings ☐ ☒ ☐
 Hole, surface worn ☐ ☒ ☐
 Surface broken, loose ☐ ☒ ☐

Floors Hole, surface worn ☐ ☐ ☒
 Surface broken, loose ☒ ☐ ☐
 Windows Broken or defective ☒ ☐ ☐

D11 INFESTATION INDEX Not Evid. Re-ptd. Ob-svd.
 Rats in unit ☐ ☐ ☒
 Other vermin ☒ ☐ ☐

D12 SANITARY INDEX Not Evid. Re-ptd. Ob-svd.
 Plumbing leakage ☒ ☐ ☐
 Plumbing obstruction ☐ ☐ ☒
 Water pressure low ☒ ☐ ☐
 Walls or floors damp ☒ ☐ ☐
 Heater hazardous ☒ ☐ ☐
 Wiring hazardous ☐ ☐ ☒

D13 SIZE OF HOUSEHOLD 7
 Number of occupants: total 7
 Number of lodgers 1
 Number of basic families 1

D14 RACE OF HOUSEHOLD White Nonwh.
☒ ☐
Ten-ant Own-er Bldg. Empl.
 D15 TYPE OF TENURE ☒ ☐ ☐
Mo. WE.
 D16 AMOUNT OF RENT \$30 ☒ ☐
Furn. Heat Neither
 Rent includes: ☐ ☐ ☒

SUPPLEMENTARY DESCRIPTION

D13a HOUSEHOLD COMPOSITION AND INCOME

MALE					FEMALE				
Age	Rel.	Income			Age	Rel.	Income		
		\$	W.	M.			\$	W.	M.
1					11				
2					12				
3					13				
4					14				
5					15				
6					16				
7					17				
8					18				

(office entries)

D13b FAMILY INCOME PER MONTH \$ D16a RENT PER ROOM PER MONTH \$ Inspected by R.L.S. Date 3/16/45Office check Field check

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FIGURE 6. DWELLING UNIT SCHEDULE WITH FIELD AND OFFICE ENTRIES

COLLECTION OF DATA

up primarily of large rooming houses the cost per unit may increase materially above the figures given in Part I. Allowances for the increase are suggested in Appendix A-1.

If the survey areas do not contain a marked concentration of rooming houses, economy will often justify ignoring this type of unit.

In a district where the concentration of rooming houses is not known, preliminary plans can be based on exclusion of rooming units, with a provision that wherever such a unit is encountered the inspector will return a dummy schedule for it. As these accumulate, plans can be made for treatment of the rooming units, perhaps on a basis which samples them by size and class of rent.

SHOULD THE SUPPLEMENTARY ITEMS BE USED?

Household Composition and Income, supplementary item D13a, must be enumerated if figures on income are wanted. Some sponsors may consider income data not pertinent to their activity, but this question should not be answered lightly. Under normal conditions, income figures give a most valuable basis for classification of the qualitative findings, and casual omission of this item may be a cause for later regret. Standard time allowances given in Appendix A-1 should cover enumeration of this item.

If income data are wanted the household composition is recorded in order to associate each income with the person who receives it. The tabular box provided for this item may look formidable, but execution of the item is rapid and simple in the ordinary cases. Household composition may be obtained under D13a, of course, without income figures. This is not recommended, however, unless the composition data are wanted for a specific purpose that will be carried out—as, for example, a detailed study of types and sizes of households for project planning purposes of a housing authority, or similar study by a relief agency or a sponsoring university department.

Family Income per Month, item D13b, is merely an entry space for the calculation from D13a.

Rent per Room per Month, item D16a, is not a special enumeration item but an extra office calculation. No choice need be made on this until the consulting period.

Nonpublic Water Supply and Nonpublic Sewage Disposal, items S8a and S9a, can usually be disregarded in centrally located urban districts. If the study covers outlying areas with incomplete utilities, these supplementary items may be wanted. As a rule they can be covered only when the inspectors are experienced members of a health department staff, or where a special report can be obtained from the health department on each structure that shows no public water supply or sewer connection under items S8 or S9 in the standard enumeration.

Daylight Obstruction, item S16a, is segregated as a supplementary item because it involves more elaborate entries, both in the field and in the office, than any other item. The standard item (S16) provides a quick screening classification of structures needing and not needing this supplementary appraisal.

In some cities, daylight obstruction by adjacent structures is so serious a factor that S16a should by all means be enumerated for the structures which receive the Yes entry for S16; perhaps in other cities both S16 and S16a might be dismissed as of little or no consequence, with appreciable saving in training and enumeration time. Preliminary judgment on this point can be based on knowledge of local conditions, subject to review with the consultant.

The standard time allowances should cover the screening test of S16 for all structures and full enumeration and processing under S16a for one-third to one-half of them—a normal proportion for cities needing this item.

SHOULD ALL STANDARD ITEMS BE USED?

The option here is to omit some or all of the maintenance index items D10-D12 and S12-S15. The deterioration index can be omitted and the other maintenance items enumerated, or vice versa. Such omissions are not recommended except in unusual circumstances.

The deterioration index item (D10, S12) takes the most training time of any standard item, and may require more supervision than any other item during the early period of field work. However, since the standard time allowances cover this item, the principal justification for dropping it would be doubt as to whether inspectors can master the instructions. Omitting deterioration would weaken the comparability of data with those from other studies to the extent that maintenance scores would run low; moreover the item is one of the most important basic deficiencies in many low-grade neighborhoods.

No standard items other than those in the maintenance index group (or S16, discussed above) should ordinarily be omitted.

It should be noted as a general principle that the omission of any item or group of items from the schedules does *not* give economy proportionate to the number of items omitted. Many of the office operations to be performed on the schedules are virtually unaffected by a few omissions or additions.

ARE SPECIAL LOCAL ITEMS WANTED?

If the community has important special types of housing deficiency not measured by the standard schedule items, inclusion of local items may be warranted.

A good test of a proposed local item is: will anything be done about the information when it is tabulated? Local items should not be proposed simply for the sake of getting more information. The standard items and *score*

ENUMERATION AND FIELD SUPERVISION

ing system provide well-balanced information which will be far from exhausted by the usual analysis and interpretation. However, where special conditions exist on which a sponsoring agency wishes to base some program, a local item should by all means be considered to deal with it.

Examples of appropriate local items are: an item on the Structure Schedule which reports (in a city with endemic plague) all structures which lack a rat-proof foundation, or an item on the Unit Schedule which reports specific types of illegal occupancy (prohibited types of space used for living) against which enforcement action can be taken under the statutes or ordinances of the community. Descriptive (non-scoring) items may also be formulated for conditions of primary interest to sponsors, as families on local relief rolls, or types of structures requiring a license. An example of this type is shown in Figure 6, item X.

As many as four such items can usually be handled on the standard punch card and schedules. A local item should have negligible effect on the cost or time requirements unless it is of a type which requires technical inspection or elaborate interviewing in the field. In general, local items will be easiest to handle if they can be so worded as to call for a Yes-No entry.

While final decisions on local items should be left until the consulting period, the workability of any proposed item should be tested in a preliminary way by determining whether clear instructions for observation can be written, as well as binding definitions for all terms to be used in the item. A checklist for this purpose is given in Appendix A-4.

ARE LEGAL VIOLATIONS TO BE REPORTED?

If the appraisal is combined with regular inspection and enforcement activities, the director must establish procedures for handling violation notices or correction orders arising from these inspections.

It should be decided whether violations and orders issued are to be reported on the regular forms of the agency concerned or on a supplementary form which can be printed on the back page of the Structure Schedule.³³ The Committee's experience in this matter is limited, but it suggests the former choice as preferable. If inspectors carry their regular notice or order books into the field, they can record the legal inspection and provide for its follow-up in the usual fashion without special handling of the schedules in the office. In this case there will be no effect on the content of the schedules unless it is desired to add a local item showing for each unit or structure whether legal violations were found there. This is good practice, as a summary of findings on legal violations can then be carried on the

³³ A simple form for this purpose is shown in Figure 8. Reproduction proofs for offset printing can be had from the consultant. Copy locally prepared and serving the same purpose can also be used.

punch card for statistical analysis.

Should it be desired to use the back of the Structure Schedule for reporting violations, special office arrangements will be necessary to assure that the legal inspection findings are processed according to the needs of the enforcement agency. Inspectors will require clipboards large enough to carry the Structure Schedule opened to its full size of 11 x 17 inches.

4. Enumeration and Field Supervision

ISSUANCE AND ROUTING

Blocks or other groups of dwellings will be assigned to enumerators in systematic rotation. It is ordinarily desirable to assign each enumerator work for only a day or two at a time, concentrating the entire field crew in a relatively compact area. Where the assignment is a block requiring several days to complete, instructions may be given to return the schedules for each block frontage as completed, in order to maintain a steady flow of schedules to the clerical staff.

Where every dwelling is to be enumerated, blank schedules will be supplied to the field staff; in a sampling study the headings of the Structure Schedules will be filled out from the sampling source before issuance, to show the address, district number and block number of each structure to be enumerated, together with its assignment number.³⁴ If sampling has been done from maps rather than from lists of structures, an optional practice is to supply the enumerator with blank schedules and a copy of the map on which the sample structures have been checked.

If maps are not supplied as the basis of assignment, as described in the preceding sentence, small-scale maps showing block numbers and street names may be desirable for all members of the field crew to save their time in hunting for particular street frontages.

Where to start. Unless there is compelling reason to do otherwise, enumeration should be started in one of the sections where the poorest conditions are expected. This will assure that the widest variety of questions and special problems will arise during the period when the director is giving closest attention to the field work. If this practice is not followed, special arrangement should be made for enumeration in the first week or two of at least some blocks of the poorest district. The purpose here is to get an indication, in the first batch of schedules processed, as to the maximum scores which can be expected; this in turn will guide the establishment of class intervals for scores on the punch cards. The same principle applies to the collection of environmental data, and the director should make sure that early work of

³⁴ Where sampling areas consist of several blocks (because of a low sampling ratio which does not permit sampling or interpretation by individual blocks), the schedule entry space for block number should carry the sampling area number followed by the block number, thus: 7-32.

ENUMERATION AND FIELD SUPERVISION

the environmental study is planned to cover some blocks where poorest environmental conditions are expected. These may or may not be the same blocks that contain the poorest dwelling conditions.

After a few days of break-in, the clerks' time can usually be conserved by issuing assignments to enumerators and receiving completed schedules from them in appropriately labelled file folders for each field worker, set out on the table or counter reserved for this purpose. This will minimize needless discussion and distraction of one group by the other.

ENUMERATION: GENERAL

Use of instructions. Full instructions for filling out the dwelling schedules are given in the Field Procedures, Appendix B. A separately bound copy of these instructions, together with needed supplementary instructions for local items, will have been supplied to each inspector in the training period. Each field worker must carry his copy of this material at all times for reference in special cases.

Working hours. Studies in several cities have indicated that inspectors can be expected to spend about seven hours of productive time in the field each day (approximately 9 A.M. till noon, and 1 P.M. till 5 P.M.) without unduly upsetting the meal arrangements and living habits of families interviewed. Time estimates given are based on such a schedule, with a five and one-half day week. Some crews have been engaged for a full six-day week, and Saturday afternoon inspections have been found particularly effective in reaching families not at home during the balance of the week.

Recalls; reserve sample. When no adult member of a household is found at home, a recall should be made. The director will decide how much effort in recalls is justified. It is usually reasonable to require one recall on the same day or on a later day before an incomplete schedule may be returned for the unit. In a sampling study, an occupied unit which cannot be inspected is replaced from a reserve sample selected for this purpose.³⁵ In a study using complete enumeration, replacements cannot be made and special arrangements may be needed to keep incomplete schedules within a tolerable ratio, preferably not over 5 percent to 8 percent of the total.

Evening reinspection. If many households have both husband and wife employed and no satisfactory informant is found at home in the specified number of recalls, it may be necessary to assign personnel to special evening or weekend recalls. This has been done with good results in two war-time surveys. Under the practice of evening recalls, items to be observed outside the struc-

³⁵ Schedules for vacant units are not replaced, but are carried forward, incomplete, for processing. One purpose of the study is to determine the location and character of vacancies, and to obscure these by replacement schedules would distort the results wanted.

ture should be completed by the day enumerator before returning a schedule to the office. Evening or weekend recalls may be needed even in a sampling study if exhaustion of the reserve sample threatens to destroy the desired ratio of sampling.

Return of schedules; dummy sheets for schedules held. A schedule is to be returned by the inspector, with at least the heading entries completed, for each structure and unit in his assignment even though the schedule cannot be completed because of vacancy or continued absence of the family.

When a Unit Schedule is being held by the inspector pending recall, all other schedules for that structure should also be held. If the remainder of an assignment is ready for return to the office, a dummy sheet for the structure held out must be returned together with completed schedules for that assignment. A supply of dummy sheets (shown in Appendix C, Figure C3) should be furnished each inspector and their use explained.

Incomplete schedules: units not accessible. A general problem arises with those units for which schedules cannot be completed for scoring because the unit is vacant, or where the family is absent through the specified number of recalls, or where access or scoring information is refused by the householder. These cases will ordinarily be a small fraction of the total, but they will cause needless work or confusion in later phases of the study if not handled consistently from the start.

The objective here is a treatment under which schedules that cannot be completely scored will be handled from the outset with a minimum of field and office work, at the same time obtaining information which permits processing and tabulation as desired in final descriptive tables. This means, in general, that descriptive items of the schedules (location, rent, etc.) should be completed in the field insofar as possible, but that scoring items on the Unit Schedules need not be completed even though they could be observed.³⁶ It means also that incomplete schedules should be processed to produce a punch card (even though partially blank) for each incompletely reported unit.

Practice will vary between sampling and full enumeration studies, and appropriate recommendations will be made by the consultant.

Language barriers. Householders who do not speak English may cause unscorable schedules, though it should usually be possible to complete the interview items by using a school child or neighbor as interpreter. If not, schedules for the unit need be completed only to the degree specified for vacant units, and "language difficulty" may be recorded in the Remarks space. Bilingual enumerators may be needed in areas where this problem is of some consequence.

Rooming units. It may be desirable to delay enumera-

³⁶ Descriptive and scoring items are specified in Section 2, under descriptions of Structure and Dwelling Unit Schedules.

COLLECTION OF DATA

tion of rooming units until the crew has become familiar with the Dwelling Unit Schedule. It may even be desirable to withhold the training on Rooming Unit Schedules until after a few days of work on dwelling units, arranging a special office session for supplementary instruction on this variant schedule. In this case, enumerators can return a Rooming Unit Schedule, completed only for the heading items, for each rooming unit encountered during the first few days of work.

In districts where the relative importance of rooming houses is not known, the return of incomplete Rooming Unit Schedules might be continued long enough to determine whether appraisal of rooming units is warranted, and if so whether complete enumeration or sampling of these units is desirable.

Sampling of rooming units may well be used even where all dwelling units are enumerated, because of the necessarily more elaborate field and office procedures for rooming houses. In this case, and if there is no reliable advance guide as to the location and size of rooming houses, the return of dummy schedules for such dwellings as they are encountered in the field will give the basis for later sampling.

If such treatment of rooming units appears desirable, detailed arrangements can be worked out during the consulting period.

FIELD SUPERVISION

Particularly during the early days of enumeration, the chief inspector should devote time on a consistent basis to joint enumeration with members of his crew in order to supplement their basic training, observe individual difficulties, criticize the approach to householders, and in general insure good quality of field work.

Continuing functions of a chief inspector or squad leader should include distribution of assignments, reception and preliminary checking of completed schedules for gross errors or omissions before return of schedules to the office, transmission of supplementary instructions or bulletins to the inspectors, joint visits with inspectors in case of difficulty, and settling with the director or chief clerk any questions arising between the field and office staffs.

The chief inspector may be required to arrange field meeting places or depots in conveniently located public buildings or reputable business establishments, where assignments and supplementary instructions can be issued, schedules returned, routine corrections made, and the like.

A field supervisor will usually be assigned the duty of field checking (independent re-enumeration of selected schedules) as described in Section 6 of this chapter.

Enumeration of daylight obstruction (supplementary item S16a) by a field supervisor may be advisable. Provision is made in item S16 for screening out those structures which will obviously not incur a serious penalty

for this item and are not worth processing. The screening entries of item S16 are readily learned by any inspector, but enumeration of S16a by a supervisor after the screening process may improve the consistency of reporting for this relatively difficult item.

The leader of a small field staff, in addition to his supervisory duties, can be expected to enumerate schedules as his time permits.

STAFF REVIEWS AND SUPPLEMENTARY INSTRUCTION

Office sessions. Within a week or so after the start of full-scale enumeration, an office meeting of the entire staff is usually desirable. A morning should suffice for this. At this first review session, consideration can be given to items on which misunderstanding is evident from the early schedules, and minor points of operating practice can be smoothed out between the field and office staffs. A brief written quiz on selected schedule items may be advisable, the director giving hypothetical conditions for which the inspectors are to complete the schedule entries.

A test of the enumerators' accuracy in pacing room dimensions is essential at this stage, since it determines the reliability of three scoring items.³⁷ Three or four lines should be marked on a floor at distances between 8 and 20 feet (in whole feet) with no indication of the distances involved. Each enumerator should be required to pace these distances and to record them on paper, with his name, for the director's comparison with the actual distances. Any consistent error exceeding one foot from the correct result should be followed by supplementary coaching of the enumerator in pacing practice, and by repetition of the test after this coaching.

Although it will be too early at the time of this review session to judge whether the speed of enumeration is proving satisfactory, some discussion of the indicated progress may be in order.

Occasional later review sessions may be desired, to compare actual progress with estimates, to encourage the alert worker and stimulate the laggard, or for other general purposes of the director. Time thus spent may be a most valuable morale builder, and when used in moderation its cost should not be begrudged.

If later review sessions of this type are not needed, special arrangements should be made for periodic retests of pacing accuracy as described above. Different distances should be used each time, and preferably a different room, hallway, sidewalk or other place. Such tests should be given regularly at intervals not exceeding one, or at the most two, weeks to protect the accuracy of this basic observation.

Bulletins. Various specific problems can be dealt with by written bulletins, issued either in connection with review sessions or separately. They may be needed from time to time to supplement the standard field pro-

³⁷ Deficiency items 19, 28, 29.

RECEPTION AND OFFICE CHECKING

cedures in the light of unforeseen local conditions, or to clarify points on which staff misunderstanding is evident, or for other purposes.

Bulletins should be handled in systematic fashion, with a clear standard format, date and serial number for each. The subject of each bulletin should be concisely stated. Means should be provided for recording the receipt of each bulletin by every enumerator. General bulletins might be posted in the office and initialled by each field worker when he has read them (or handled similarly through the field supervisor). Any bulletin which modifies the basic Field Procedures should be issued with a copy for each inspector and in a form to be carried conveniently by him.

Such material should ordinarily be issued in the name of the director and after his review.

5. Reception and Office Checking

RECEPTION: GENERAL

Each day, or at other frequent intervals as determined by the director, the clerk receives enumerated schedules and makes new assignments to the field staff.

Schedules are checked, on the day of receipt, for conformity with the assignment, for completeness and for internal evidence of consistency. Schedules requiring correction by the enumerator should be returned to him not later than the next day.

If the Record of Legal Violations and Action Taken is used as a supplement to the Structure Schedule, the director will specify the method of handling entries on this form.

CHECK FOR CONFORMITY WITH ASSIGNMENT

The checking operations to be described, while basic to the accuracy and smooth functioning of later work, are routine operations of which only the general nature need be indicated here. Full instructions are given in Appendix C-2, which should be reviewed by the director before checking begins.

The check for conformity consists primarily in determining that the correct number of schedules has been returned for each structure, that street addresses and block numbers agree, and that the structures enumerated under a sampling inspection check with the assignment list. Under complete enumeration the clerk may be required to check Structure Schedules against a map to be sure that no dwelling has been missed, or the field supervisor may be responsible for this check before returning schedules.

CHECK FOR COMPLETENESS OF ENTRIES

To assure that all possible schedules are fully scorable, entries are scanned for omissions. The inspectors' notes under Remarks are reviewed for any effect they might have on scores, and adjustments, if needed, are made in the scoring entries.

CHECK FOR INTERNAL CONSISTENCY

Comparison is made of the entries in certain related items to detect enumerators' misunderstandings of instructions. The clerk's instructions for this operation may be altered during the consulting period to include local items in the consistency check or to omit steps irrelevant to local conditions.

The consistency check is particularly useful in the early days as a spotter of confusion or careless work. With a good field crew it may be safely relaxed at the director's discretion in later stages of the work.

The consistency check is not relied on as the guarantee of accurate field work; that is supplied by the field check described in Section 6. It is a quick incidental check designed in part to show up discrepancies which can be treated more readily at this stage than if they were left to show up later in the scoring template.

REISSUANCE FOR CORRECTION

Clerks will return to the inspector schedules with needless omissions or inconsistency, for completion or correction. They will also return schedules with illegible or careless entries which would impede processing. An exacting policy in this matter should be supported by the director, since the need to repeat careless work will impress on the enumerator that good standards are expected of him and it will in the end save everyone's time.

6. Field Check

PURPOSE AND RATIO OF CHECKING

The accuracy of field work must be protected by independent re-enumeration of a proportion of the schedules. Organization for this is a basic responsibility of the director, for the setup will require his judgment. Although most of the work required can be supervised by a clerk the procedures are discussed in full below to force them on the director's attention.

The clerk will select from each completely enumerated block or other area an agreed percentage of the schedules for reinspection. It is ordinarily advisable in the early stages of a project to field check 10 percent of the units completed by each inspector, together with the structures containing these units. At the director's option this ratio may be reduced perhaps to 5 percent when the survey is well under way and the enumerators have given evidence that they fully understand instructions and are doing conscientious work. If some enumerators are clearly superior to others, a lower ratio of checking for certain individuals may be permitted, though none should wholly escape it.

METHOD

The machinery to be described should be set up within a few days of the start of full-scale enumeration, to prevent piling up of unchecked schedules.

COLLECTION OF DATA

Units to be field checked should be selected only after office checking operations described in the previous section have been completed for a block or group of blocks. Every tenth Unit Schedule may be taken arbitrarily, or the selection may be made to assure that a correct proportion is obtained from each type of dwelling structure (1-family, 2-family, tenement, etc.). A schedule in which the clerk suspects careless or dishonest work may be included within the percentage specified for field checking if the re-enumeration can be made promptly and the suspected lapse on the part of the enumerator is not so gross as to demand summary investigation by the director.

It will ordinarily be desirable to designate for field checking a certain number of units in excess of the stipulated percentage, to allow for units to which the field checker cannot gain access on a single call. The field checker should be permitted some selection as between units within multi-family structures, in case he fails of access to those selected by the clerk.

The original schedules for structures included in a field check may be removed from their block folders to a pending file to facilitate comparisons with the field check results, and dummy sheets for these schedules should be placed in their block folders.

The field check must of course be completely independent of the original enumeration. The field checker should therefore be given schedules filled in with only the address of the structure and the location of the unit or units to be checked in the structure. He is never supplied with the schedules originally enumerated.

Schedules issued to the field checker must carry positive identification which will prevent their being confused at any later stage with schedules of the original enumerator. A simple means is to cut off the upper right-hand corner of the schedules (both unit and structure) on a 45° angle, $\frac{3}{4}$ inch to 1 inch back from the corner. This can be done quickly in quantity, before issuance, with a knife and straight-edge. By preventing the assignment of serial numbers in the normal position, this treatment acts as a positive stop to inclusion of duplicate field check schedules in the processing operation.

If the study employs sampling, with assignment numbers for Structure Schedules, each Structure Schedule for field checking might be keyed to its original by repeating the assignment number in colored pencil.

Dwelling units will ordinarily be completely re-enumerated, though specific item omissions (such as D13a) may be authorized. In rooming units item R9 may be covered by inspecting only a portion of the rooms—perhaps those on one floor or as otherwise agreed between the clerk and field checker. Where this practice is followed, some tolerance must be allowed between the original and field check results, particularly in items R10-R12.

On the Structure Schedule all items will be completed

which can be enumerated without access to other units in the structure. This will ordinarily mean no exclusions except S5 and possibly S13. S16a may also be omitted, however, particularly if original enumeration was by a field supervisor.

The field checker will sign or initial all his schedules in the entry space provided for that purpose.

A record of field checking by blocks or other areas is provided in the Progress Control Table,³⁸ but the director may also require special records to show the ratio of field checking to original enumeration, by areas or by inspectors.

FOLLOW-UP

The clerk and field checker will compare the entries on the original and field check schedules. Significant differences between the two must be appropriately followed up with the original enumerator to secure correction and prevent errors in future reporting.

If it is found that an enumerator has consistently misinterpreted any schedule item, all of his schedules completed up to that point should be re-examined for the item in question. In some cases these schedules can be corrected in the office by the enumerator himself on the basis of his corrected understanding and memory of the field conditions. Where necessary, however, the dwellings previously covered by that enumerator (and which have not been re-enumerated by the field checker) should be re-enumerated by him for the item in question. This should be allowed on agency time, which is one cogent reason for pushing the field check as promptly as possible after original enumeration.

Schedules returned by the field checker are, of course, a duplicate set for the dwellings in question. Corrections indicated by the field check will ordinarily be made on the original schedules and the duplicates will be assigned to the dead file provided, separate from the files of schedules headed for processing.

PERSONNEL

If a chief inspector or squad leader is not used, one of the best enumerators may be assigned part-time to field checking the work of others, his schedules to be checked by the director or another enumerator. Where the field supervisor or squad leader is used, field checking should be regarded as a normal part of his duties. He may be given discretion as to details of this operation, but the fundamental principles of independent re-enumeration, consistent ratios, and effective follow-up should never be violated.

TIME ALLOWANCE

Re-enumeration at the initial rate of 10 percent, reducing to 5 percent for the bulk of the study, should be carried as a 10 percent surcharge on the total number of

³⁸ Explained in Section 8 of this chapter.

ASSIGNMENT OF SERIAL NUMBERS

units, to allow for time spent in comparing schedules, conferring with original enumerators, etc. The cost estimates of Appendix A-1 carry field checking at this ratio.

FUNCTION OF THE DIRECTOR

Field checking should be conducted with the same matter-of-factness as any other function of the study. The director should prevent any air of furtiveness or sleuthing by making it clear in the training sessions that this operation will be carried out both to make sure that inspectors understand their instructions and to protect the good name of the study in general. While pointing out that the system of field checking implies no suspicion of anyone, he can indicate that unfaithful work revealed by field checking will constitute grounds for discharge from the staff.

Ease of carrying out the reinspections may vary considerably with the character of the neighborhoods studied. The Committee's experience has been that in many low-grade areas the families are so accustomed to health or building department inspections that one more or less makes little difference and there is no resistance to a recall. Where resistance is found or expected, however, the director may need to work with the field checker on an approach that will explain the purpose to householders, or on a short-cut procedure which will minimize disturbance to families while preserving the essentials of independent reinspection.

7. Assignment of Serial Numbers

As the last step of data collection, the clerks assign serial numbers to Structure and Unit Schedules for control and reference in later operations. Appendix C-2 gives full instructions for this operation.

A suggested form of Dwelling Serial List, on which the work is based, is given in Appendix C-2. This form will be reviewed during the consulting period and it can be mimeographed locally with modifications as needed.³⁹

When serialized the schedules are ready for the processing operations.

8. Administration

GENERAL RESPONSIBILITY OF DIRECTOR

Several factors combine to make the data collection period a time of maximum demand on the director's organizing skill. All personnel will be inexperienced,

³⁹ It should be noted that if the complete environmental appraisal is being made and if its staff has no other source of data on total population per block (for item 3 of environmental Block Appraisal Form), this information can be quickly compiled by the dwelling survey staff in serializing the schedules, using a column of the Dwelling Serial List provided for that purpose. The need for this operation should be checked and the clerks instructed accordingly.

and some misunderstandings are to be expected in the early days of operation. Moreover, the data collection phase is the only one which involves both field and office operations, necessitating coordination of the work of two staff groups. Finally, the director must judge how soon and how fully the work of later phases can be interwoven with the office operations of data collection. He must therefore plan to give undivided attention to the study until data collection is well launched and running smoothly. He should participate in or closely observe all operations to make sure that he understands the possibilities and limitations in each task.

The tone of inspectors' approach to householders must be watched, to avoid needless friction or complaints to the sponsoring agencies, and the director should accompany each field worker on several calls as early as possible. With a large crew this participation in field work may necessarily be restricted to calls with squad leaders, who would in turn be charged with maintaining the proper tone of approach within their crews.

Smooth working relations between a chief inspector or squad leaders and chief clerk should be encouraged by clearly defining the responsibility and authority of each. A field supervisor should be given latitude in the manner of accomplishing his results, but the quality of those results must always be open to vigorous criticism by the clerks, who are responsible for processing the completed field schedules and for all materials derived from them.

SCHEDULE FILES AND PROGRESS CONTROLS

Two basic instruments of control are administered by the clerks both during collection of data and processing. These are the Progress Control Tables and the system of files for dwelling schedules. On the Progress Control Tables the clerks record every operation as it is performed for each block or other area, providing a continuous graphic record of the status of all work.

Progress Control Tables also simplify the schedule filing system. The only file folders needed are a set which provide one labelled folder for the schedules of each block. The status of schedules is not shown by transferring them from one file folder to another, but rather by transferring the block folder from one section of the file to the next as each operation is performed, placing it behind a file guide (divider) which corresponds to the last operation shown on the Progress Control Table. This practice supplies a virtually foolproof record of work status.

A specimen Progress Control Table for the data collection phase is given in Appendix C-1. This table will be adapted to conditions of the local study during the consulting period.

Filing practice is further described in Appendix C-1. The chief clerk should be able to prepare materials for the filing system during the consulting period.

COLLECTION OF DATA

TIME RECORDS

Efficiency and control of cost will be enhanced by systematic records of clerical time distribution. A suggested form for such records is given in Appendix C-1; this may be adapted for local use during the consultant's visit. It is usually unnecessary to keep daily time records for field personnel, since the schedules they complete will supply the basis for study of their output and efficiency.

CONTROL OF ACCURACY

Safeguards of the quality of work are provided in the systematic checking procedures outlined in earlier sections and in Appendix C-2. The director should familiarize himself with these as work proceeds, and may wish to do such independent checking at random as is indicated by the competence and alertness of his staff.

REVIEW OF PROGRESS AND COST

After a week or two of enumeration—when an approach to normal output can be assumed—the productivity of enumerators should be reviewed. The time record provided at the foot of the Structure Schedule would be meaningless in the first few days, but it may be used as soon as it will produce a significant record. After a breaking-in period, enumerators can be expected to attain an average speed of 15 to 20 minutes per dwelling unit (net time for completing the Unit Schedule only). This rate will give normal leeway for completing Structure Schedules, for time lost between units, recalls, etc. within the gross rate of about 30 minutes per unit

(including the unit's share of structure time), which is used in the standard time allowances of Appendix A-1. As indicated earlier, additional time must be allowed for factors such as large rooming units or reporting of legal violations.

A rate of two completed units per hour (gross) or 15 units per day is a reasonable goal when considered as an average for the entire crew. Some tolerance above or below this rate should of course be allowed for individuals. Rates very much slower than this figure, however, will usually be found to involve discursiveness on the part of the inspector, unnecessarily minute examination of the premises, or other factors which can be discouraged.

Coaching of the slow may be needed, or economy may lie in weeding out those who cannot achieve a pace normal for the majority of the crew, even though the enumeration period may be lengthened and the original balance between field and office work upset. A condition which cannot be cured in this manner may require curtailment of areas to be studied or dropping some time-consuming schedule item. It is better to foresee such adjustments and replan the work in time to preserve a balanced study than to run head-on at a later stage into a time or money deadline.

Time distribution and progress of clerks should be reviewed periodically. Unsatisfactory progress may call for coaching in particular operations, improved physical arrangements, test runs to determine a reasonable pace and daily output, or reallocation of duties from one person to another.

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Chapter IV

PROCESSING

1. Scope of Work

Office operations described in this chapter carry the data for each unit and structure from field schedules onto an appraisal form and punch card, on which the environmental score is combined with dwelling data.

Work of this phase, done wholly by the clerical staff from instructions in Appendix C-3, is highly routinized. Operations are performed in the following sequence:

Calculations. Office entries are made for daylight obstruction on Structure Schedules with supplementary item S16a enumerated—usually a minority of the cases. On all Unit Schedules, room areas are calculated and rooms of substandard areas are determined; monthly income of families is also totalled where this item has been enumerated.

Scoring. Structure and Unit Schedules are processed through templates to complete the descriptive and scoring entries on appraisal forms and punch cards.

Coding. Punching Code Sheets attached to the appraisal forms are completed as a guide to card punching.

Card punching. A statistical card is punched for each dwelling or rooming unit.

Filing, preparatory to analysis. Schedules, not needed in further operations, are permanently filed. Appraisal forms and punch cards are filed for further use.

On completion of processing, punch cards are ready for tabulation and analysis.

The next section explains the devices used to mechanize and speed the work; Section 3 describes the stages of processing sufficiently to bring out supervisory responsibilities of the director or chief clerk.

2. Primary Materials

SCORING TEMPLATES

Two templates are used, one for the Structure Schedule and one for the Dwelling and Rooming Unit Schedules. The templates are masks behind which the completed schedules are slipped for scoring. The structure template and method of reading scores from it are illustrated in Figure 10. Windows in the template reveal

significant entries for descriptive and scoring items on the schedule.⁴⁰ Beside each window for a scoring item are given the penalty values for that item.

In general the entries for acceptable conditions, earning a zero score, occur in left-hand boxes of schedule items and are concealed by opaque portions of the template. For example, in scoring item 1 of the illustration (second window at the left) the scoring operator, finding blank entry boxes in the window, enters the zero score (a dash line) on the appraisal form—knowing that the schedule has been checked for completeness and that it carries an entry for the acceptable condition (in this case access from the street) which is hidden. In item 6, however, X's visible in the two left boxes call for the penalties shown in the corresponding position beside the window—4 and 5 points respectively—and a score of 9 points is entered on the appraisal form for the item. Scores cited from this example will be found on the appraisal form of Figure 9.

Scoring is done by a series of approximately straight-line scanings of the template windows. First the descriptive and scoring items of the Structure Schedule are recorded on the appraisal form. The Unit Schedule is then scanned through its template and the remaining descriptive and deficiency items are recorded to complete the appraisal form for that unit and its containing structure.

Scoring values on the template express the judgment of the Committee and its scale-construction consultants as to the importance of each deficiency. Where the significance of a schedule item varies from one region or locality to another, the scores can be varied merely by changing the values on the face of the template. When such a change has been ratified, scoring can proceed with the altered value in the same way as though the standard value had been used. In short, the template carries the factor of expert judgment, and the scoring operation is a wholly mechanical one within the capacity of any intelligent clerk.

⁴⁰ Item numbers appearing on the template faces are those of the Unit Appraisal Form (Figure 9); they bear no relation to item numbers of the schedules.

PROCESSING

UNIT APPRAISAL FORM

The Unit Appraisal Form is prepared from the templates as explained above. Figure 9 shows the form completed for the dwelling unit represented by schedules in Figures 5 and 6.⁴¹

This form serves seven purposes:

- 1) It separates descriptive and appraisal items (which are mingled on the field schedules for convenience in enumeration).
- 2) It translates schedule entries for each appraisal item into a penalty score (zero or some positive value).
- 3) It groups these scores under facilities, maintenance and occupancy so that subtotal penalties are readily obtained for these three significant classifications.
- 4) It expresses the total dwelling score of the unit (by addition of the three subtotals).
- 5) It brings together the total dwelling and environment scores and combines these into the total housing score for the unit.
- 6) It designates basic deficiencies present in the unit (in the column at the right of penalty scores) and shows the total number of these.
- 7) It provides the information needed to code the punching of a Unit Punch Card.

When a local schedule item is used the score is charged to the subtotal appropriate to the nature of the item: facilities, maintenance or occupancy (see Figures 9 and 10, item w).

While analysis of any considerable body of data is made from punch cards, yet to be described, the appraisal forms can be used for a variety of case studies and individual action.

For most of the 30 deficiency items, any score which can appear on the appraisal form will designate a single condition which can be described in exact terms, or an equally exact combination of conditions. Thus, the scores carry meaning which would require many paragraphs of text to express. One who is familiar with the scoring values can describe the condition of a dwelling in detail from the scores alone, without reference to the field schedules.⁴²

If a health department were to take to court the appraisal forms for dwellings involved in enforcement action, most of the testimony needed could be developed orally from these forms by the inspector. It seems reasonable to expect that judges, after gaining some familiarity with the scoring system, would welcome the concise ex-

⁴¹ Both steps in completing the appraisal form for this unit are illustrated in Appendix C-3, Figures C22 and C23.

⁴² This statement does not apply to item 22, Deterioration Index, or item 24, Sanitary Index. In the latter case, checkmarks can be entered in the key item at the foot of the appraisal form to indicate the conditions contributing to the score. Abbreviations given in that key signify the following conditions: refuse containers defective, garbage accumulated, other refuse accumulated, plumbing leakage, plumbing obstruction, water pressure low, walls or floors damp, heater hazardous, wiring hazardous.

HOUSING SURVEY DEMONSTRATION

City Washington State D.C.

UNIT APPRAISAL FORM

☐ Rooming Unit Serial U 753

I. DESCRIPTION

STRUCTURE: Address 1253 Alpha St.
 District No. 2 Block No. 17 Appr. Area No. _____
 Owner or Agent Omega Realty Not Avail. for Occup. ☐
 Number of Units: Dwelling 3 Rooming _____ Business _____
 Stories 3 Wood ☒ Attached ☐ Toilets 2 Baths _____
 UNIT: Floor 3d Part all Unit No. _____
 Rooms 5 Occupants 7 With Lodgers ☐ Nonwhite ☐
 Occupied by: Tenant ☒ Owner ☐ Bldg. Employee ☐ Vacant ☐
 Rent \$ 30 per mo. ☒ per wk. ☐ Incl. Furn. ☐ Incl. Heat ☐
 Monthly Income \$ _____ Rent: Rm/Mo \$ _____ by R. L. S. Insp. 3/16/45

II. APPRAISAL

DEFICIENCY ITEM		Penalty Score Points	Basic Defic.
A. FACILITIES			
1. STRUCTURE: Main Access		-	-
2. Water Supply (Source)		-	-
3. Sewer Connection		-	-
4. Daylight Obstruction		-	-
5. Stairs and Fire Escapes		<u>15</u>	-
6. Public Hall Lighting		<u>9</u>	-
7. UNIT: Location in Structure		-	-
8. Kitchen (or Special Rooming Unit) Facilities		-	-
9. Toilet: Location <u>8</u> Type <u>-</u> Sharing <u>10</u>		<u>18</u>	✓
10. Bath: Location <u>20</u> Type <u>-</u> Sharing _____		<u>20</u>	*✓
11. Water Supply (Location and Type)		<u>8</u>	-
12. Washing Facilities		<u>8</u>	-
13. Dual Egress		-	-
14. Electric Lighting		-	-
15. Central Heating		<u>3</u>	-
16. Rooms Lacking Installed Heater		<u>10</u>	✓
17. Rooms Lacking Window		-	-
18. Rooms Lacking Closet		<u>5</u>	-
19. Rooms of Substandard Area		-	-
20. Combined Room Facilities (Items 16-19) <u>15</u>		<u>8</u>	-
w <u>8</u> x _____ y _____ z _____		<u>104</u>	-
a. Subtotal: Facilities			
B. MAINTENANCE			
21. Toilet Condition Index		<u>3</u>	-
22. Deterioration Index: Struc. <u>23</u> Unit <u>16</u>		<u>39</u>	*✓
23. Infestation Index: Struc. <u>5</u> Unit <u>7</u>		<u>12</u>	-
24. Sanitary Index: Struc. <u>7</u> Unit <u>9</u>		<u>16</u>	-
25. Basement Condition Index		-	-
w _____ x _____ y _____ z _____		<u>70</u>	-
b. Subtotal: Maintenance			
C. OCCUPANCY			
26. Room Crowding: Persons per Room		<u>8</u>	-
27. Room Crowding: Persons per Sleeping Room		<u>5</u>	-
28. Area Crowding: Sleeping Area per Person		<u>8</u>	-
29. Area Crowding: Nonsleeping Area per Person		-	-
30. Doubling of Basic Families		-	-
w _____ x _____ y _____ z _____		<u>21</u>	-
c. Subtotal: Occupancy			
D. DWELLING TOTAL		<u>195</u>	4
E. ENVIRONMENT TOTAL w x y z v		<u>84</u>	-
F. HOUSING TOTAL		<u>279</u>	-

Key to Sanitary Index (Item 24)

Yes: Rcd ☒ Go _____ Ora _____ Reported: Pl _____ Po _____ Wpl _____ Wfd _____ Hh _____ Wh _____
 Extreme: Rcd _____ Go _____ Ora _____ Observed: Pl _____ Po _____ Wpl _____ Wfd _____ Hh _____ Wh _____

Form DS-4: Copyright 1944, Committee on the Hygiene of Housing
 American Public Health Association

FIGURE 9. UNIT APPRAISAL FORM

Assignment

No. _____

DWELLING SURVEY

WASHINGTON HOUSING ASSOCIATION, WASHINGTON, D. C.

Serial No. S 466

STRUCTURE SCHEDULE

Address 1253 Alpha Street District No. 2 Block No. 17 Structure No. _____
 Owner or Agent Omega Realty Company Not Available for Occupancy ☐

Units: Dwelling <u>3</u> Rooming <u>—</u> Business <u>—</u> Total <u>3</u> Stories Wood <input checked="" type="checkbox"/> Attached <input type="checkbox"/> Toilets, Baths <u>2</u> <u>—</u>		5 STAIRS AND FIRE ESCAPES <input type="checkbox"/> N.A. See below If X's in 2 boxes of top line: 2 story structure 10 pts. 3 " " 20 pts. 4+ " " 30 pts. 30 Maximum																	
1 ACCESS 3, 6 <input type="checkbox"/> Rear Yard <input type="checkbox"/> Alley <input type="checkbox"/> 2 WATER 3, 8 <input type="checkbox"/> Private <input type="checkbox"/> None <input type="checkbox"/> 3 SEWER 3, 8 <input type="checkbox"/> Private <input type="checkbox"/> None <input type="checkbox"/>		6 PUBLIC HALL LIGHTING <input type="checkbox"/> N.A. 4, 8 <input checked="" type="checkbox"/> Part <input type="checkbox"/> All 5, 10 <input checked="" type="checkbox"/> <input type="checkbox"/>																	
2a WATER 10 - 25 <input type="checkbox"/> 2a SEWER 10 - 25 <input type="checkbox"/> No <input type="checkbox"/>		22 DETERIORATION 3, 8 <input type="checkbox"/> <input checked="" type="checkbox"/> 1, 3 <input type="checkbox"/> <input type="checkbox"/> 2, 4 <input type="checkbox"/> <input type="checkbox"/> 1, 3 <input type="checkbox"/> <input type="checkbox"/> 2, 5 <input checked="" type="checkbox"/> <input type="checkbox"/> 1, 4 <input type="checkbox"/> <input type="checkbox"/> 25 Max.																	
4 DAYLIGHT OBSTRUCTION <table border="1"> <thead> <tr> <th>Factor</th> <th>Pts.</th> </tr> </thead> <tbody> <tr><td>0 - .49</td><td>0</td></tr> <tr><td>.50 - .74</td><td>2</td></tr> <tr><td>.75 - 1.49</td><td>5</td></tr> <tr><td>1.50 - 2.99</td><td>8</td></tr> <tr><td>3.00 - 3.99</td><td>10</td></tr> <tr><td>4.00 - 4.99</td><td>15</td></tr> <tr><td>5.00 or more</td><td>20</td></tr> </tbody> </table>		Factor	Pts.	0 - .49	0	.50 - .74	2	.75 - 1.49	5	1.50 - 2.99	8	3.00 - 3.99	10	4.00 - 4.99	15	5.00 or more	20	24 SANITARY INDEX Poi 1, 2 <input checked="" type="checkbox"/> <input type="checkbox"/> Ga 2, 6 <input type="checkbox"/> <input checked="" type="checkbox"/> Ora 1, 2 <input type="checkbox"/> <input type="checkbox"/> 25 BASEMENT CONDITION <input checked="" type="checkbox"/> N.A. R, 3 <input type="checkbox"/> <input type="checkbox"/> R, 4 <input type="checkbox"/> <input type="checkbox"/> R, 6 <input type="checkbox"/> <input type="checkbox"/> 4a SCREENING OF DAYLIGHT OBSTRUCTION Yes <input type="checkbox"/> Ext. <input type="checkbox"/>	
Factor	Pts.																		
0 - .49	0																		
.50 - .74	2																		
.75 - 1.49	5																		
1.50 - 2.99	8																		
3.00 - 3.99	10																		
4.00 - 4.99	15																		
5.00 or more	20																		
W: yes = 8 pts.																			

Structure Scoring Template
 Housing Appraisal Method of Committee on the Hygiene of Housing, APHA

FIGURE 10. SCORING TEMPLATE WITH STRUCTURE SCHEDULE

PROCESSING

pression of housing defects to be found in the appraisal form, and would relate their decisions to the severity of conditions thus revealed.

PUNCH CARDS: HOLLERITH OR MARGINAL

As indicated in Part I, the Committee has desired to make the advantages of analysis from punch cards available to all users of this method, whether or not they have access to tabulating machines for the Hollerith type of punch card. Where such an installation is available, the data can be processed from the Unit Appraisal Form by the usual methods of coding and card punching, and a machine punch card appropriate to a particular study can be laid out with advice of the consultant. It is expected, however, that the majority of users will not have convenient access to tabulating machines. For that reason the punch card designed as a standard part of the method is of the marginally-punched type which requires no machinery for punching or sorting and can be handled by any competent clerk after brief instruction.

THE MARGINAL PUNCH CARD: GENERAL

The marginal punch card is a more limited instrument than the machine card in that it carries less punching detail on a card of given size. This limitation has been largely overcome, for purposes of this method, by careful integration of the punching code with the penalty scales so that the limited amount of punching possible produces adequate information in classifications of maximum utility.

A further limitation of the marginal punch card, and one which has greatly limited its use for statistical analysis, is the fact that while the cards can be sorted rapidly, they are normally counted by hand after sorting, to determine percentage or other distributions. This is a basic weakness as compared with the rapid machine counting of the Hollerith type card, but this limitation has also been removed. The Committee's staff has developed a simple device which determines percentage distributions from the sorted cards by direct scale-readings rather than by counts. This is a very rapid operation and under certain conditions it has shown advantages even over machine tabulation. The scaling device and its use are explained in the chapter on analysis.

PRINCIPLES OF MARGINAL PUNCHING

The marginal punch card carries pre-punched holes at close intervals just inside the four edges of the card. This is illustrated in Figure 11, the standard Unit Punch Card. Before considering the organization of this particular card, it is necessary to understand the theory of marginal punching.

Only the edges of the card are used for punching, and the body, unlike that of the Hollerith card, can be wholly devoted to written entries, if desired. Each hole

or group of holes represents the data for some specific point. When a given characteristic occurs in the case represented by a punch card (here a dwelling unit) the edge of the card is slotted out with a punch at the appropriate hole, leaving a V-shaped opening at the margin. The slotted cards are sorted by aligning them, passing a long needle through the hole for the item under analysis, and tumbling the cards on the needle. Those which have been slotted for that item fall out of the pack and are regrouped behind the unslotted cards which have remained on the needle or tumbler. A group of cards slotted in one position is shown in Figure 12A.

The simplest use of the card is for a Yes-No item, or one having any other two-part classification. Such an item is assigned one hole on the card. This treatment is used at the upper left of Figure 12B to distinguish a rooming unit from a dwelling unit. For a rooming unit the margin is slotted out at this position; for a dwelling unit the card is left unslotted.

Where an item involves several classes, or where a series of numbers is to be punched, as for block and district location, additional positions (holes) of the punch card are assigned to the item and these positions are numbered.⁴³

Assignment of two positions to an item permits punching four classes (see Tenure, Figure 12B). The positions are numbered 2 and 1, and slotting is as follows:

Class 0:	unslotted
Class 1:	slot position 1
Class 2:	slot position 2
Class 3:	slot positions 2 and 1.

Three holes provide eight classes (see Rent, Figure 12B). The added hole carries the value 4 and the following code is used:

Classes 0-3:	as above
Class 4:	slot position 4
Class 5:	slot positions 4 and 1
Class 6:	slot positions 4 and 2
Class 7:	slot positions 4 and 2 and 1.

Four positions provide up to sixteen classes (see Number of Occupants, Figure 12B). The added hole carries the value 8 and the slotting is coded thus:

Classes 0-7:	as above
Class 8:	slot position 8
Class 9:	slot positions 8 and 1
Class 10:	slot positions 8 and 2
Class 11:	slot positions 8 and 2 and 1
Class 12:	slot positions 8 and 4
Class 13:	slot positions 8 and 4 and 1
Class 14:	slot positions 8 and 4 and 2
Class 15:	slot positions 8 and 4 and 2 and 1.

⁴³ In the case of a one-hole item, the hole need not be numbered, but an unslotted card is considered to fall in class 0, a slotted card in class 1.

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PROCESSING

Class 0 often carries a positive meaning, as in the classification of dwelling units and rooming units noted above. With a numerical series such as Number of Occupants, however, class 0 has the meaning zero.

Numerals of two, three or more digits can be punched by assigning a four-position field to each digit: one field for units, one for tens, one for hundreds, etc. For example, block 49 would be punched as follows:

Tens field: slot position 4
Unit field: slot positions 8 and 1.

The punching of Figure 12B shows the following characteristics, from left to right: dwelling unit (not rooming unit), class 0 tenure (rented), rent in class 3 (\$15-\$19.99 per month), 6 rooms, 10 occupants, occupancy score in class 8 (70-79 points), location of unit in block 20. For illustrative purposes these fields have been rearranged from their positions on the standard Unit Punch Card, the organization of which may now be considered.

THE UNIT PUNCH CARD

The body of the Unit Punch Card (Figure 11) carries the same information as the Unit Appraisal Form. These two forms are supplied in pairs, and entries on the appraisal form are simultaneously recorded on the punch card by carbon paper between the two. These entries provide part of the coding needed to punch the card, and the balance of the coding information is carried on a Punching Code Sheet attached to the appraisal form.⁴⁴

Descriptive items. The right side of the card is devoted to punching the location and other descriptive characteristics of the unit. Four four-hole fields are reserved for district, block and appraisal area numbers. One hole is reserved for punching a master card for one unit in each structure. This permits analysis of certain factors by structure rather than by unit. In addition to the fields with self-explanatory captions, several single holes and a two-hole field are reserved for special punching. These provisions give considerable flexibility for local needs.

Deficiency items. The standard deficiency items are carried on the left side of the card (identified only by item numbers 1-30) and are punched according to their penalty scores. The more important items are given two holes each and can be slotted for any of four classes to represent the range from a zero score to the most extreme penalty. Other items carry one position each and are slotted if the score for the item exceeds a stipulated value.

As previously noted, the scores (and hence the punching) represent conditions that can be exactly specified. Therefore the classification of cards by sorting for deficiency items has a meaning quite as definite and clearly

read as with the descriptive items illustrated above. For example, in item 11 class 0 means hot and cold water inside the dwelling unit; class 1, cold water only, in the unit; class 2, water supply outside the unit but within the structure; class 3, water outside the structure. The classifications possible with the 41 positions assigned to standard deficiency items exceed the demands of the usual analysis, and it has seldom been found necessary to go beyond the class punching to a supplementary hand-sort of the exact scores—given in the body of the punch card for that purpose.

Total scores and miscellaneous. The ends of the card carry the subtotal and total scores, the number of basic deficiencies and punching for local items in the w, x, y, z series. Facilities, maintenance and occupancy scores are usually punched in classes of 10 points; dwelling, environment and housing scores in classes of 20 points. The number of basic deficiencies is slotted for direct reading: 0, 1, 2, 3, and so on. Cards with score incomplete are punched in the single hole designated Scr Inc and a single hole v is available for various special purposes.

3. Specific Operations

This section, intended for reference during execution of the study, may be disregarded in a preliminary reading.

CALCULATIONS

Checking and serializing of schedules, described in Chapter III, must have been completed before calculations are undertaken.

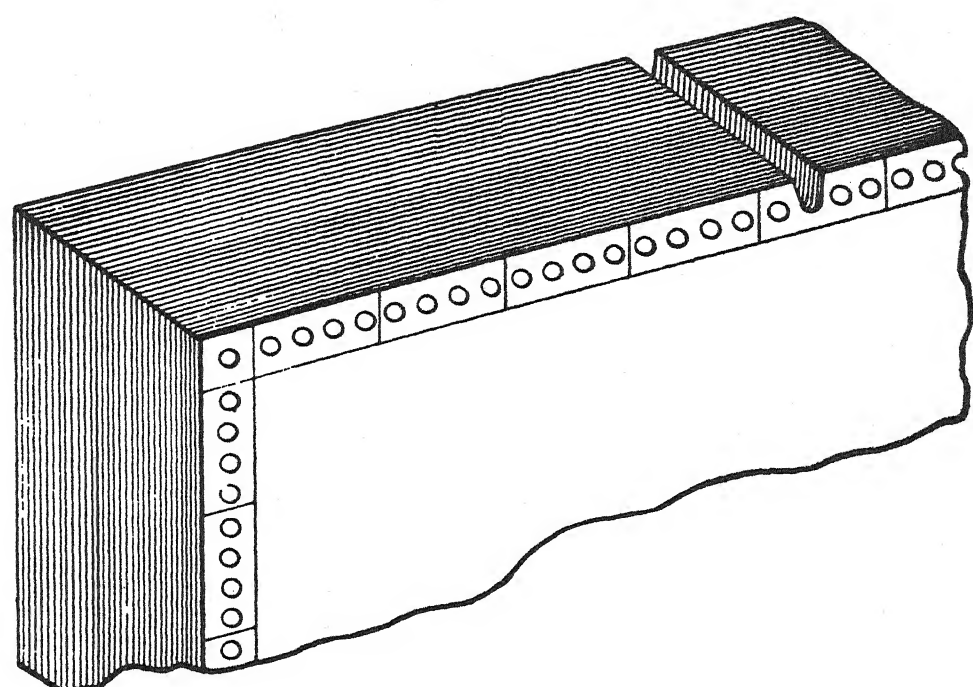
Standard practice for the Structure Schedule requires only the office entries for Daylight Obstruction on those schedules with supplementary item S16a completed. If nonpublic Water Supply and Sewage Disposal (schedule items S8a and S9a) are enumerated, special entries needed may be made at this stage from health department records.

On the Dwelling Unit Schedule the four lines of office entries for item D9 are completed. Item D13a, if used, is processed to convert weekly incomes to a monthly figure, and to get the total monthly income for item D13b. Rent per Room per Month, item D16a, is not a standard calculation, but if desired it is figured from items D16 and D9.

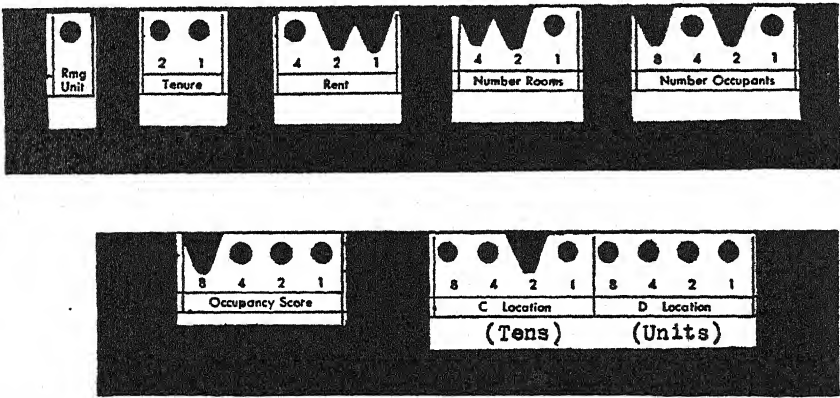
On the Rooming Unit Schedule the three lines of office entries for item R9 are made, and Average Room Rent is calculated (R16) where this entry has not been made in the field.

Supervision. The director's chief task is to see that operations are being handled accurately and in efficient sequence. All calculations can be done by single clerks, working concurrently on different items of the field schedules.

⁴⁴ For the Punching Code Sheet, see Appendix C-3, Figure C24.



A. Marginal Punch Cards, All Slotted in One Position



B. Typical Slotting of Marginal Punch Card Fields

FIGURE 12. SLOTTING OF MARGINAL PUNCH CARDS

PROCESSING

SCORING

For this operation a supply of appraisal forms and punch cards will be needed and templates must be ready. Preparation may require adding to templates the scoring values for local items or local changes in the scores for standard items.

If the environmental survey is being made, environment scores for each block should be available to clerks of the dwelling survey at the time of scoring. These scores may be taken from the Block Appraisal Forms, borrowed for the purpose, or from a condensed transcript which gives the Environment Total Score for each block frontage.

The director will decide whether the clerks are to record the inspector's initials and inspection date on the last line of the description items of the Unit Appraisal Form. This is not usually necessary unless it is expected that appraisal forms may be used in court action.

Standard practice is to handle all Structure Schedules for a block or group of blocks before scoring Unit Schedules.

Structures. Five lines of description items for the structure are completed except for the appraisal area number, which is determined later (during analysis) and entered retroactively—usually only on the punch card. Appraisal items 1-6 are scored, followed by structure components of items 22-24, and item 25. The Environment Total Score is entered at the foot of the form.

The appraisal form with entries described above is shown in Appendix C-3, Figure C22.

Units. In scoring Dwelling Unit and Rooming Unit Schedules the two types of schedules are not separated, but are taken in order as they come in any structure. Four lines of unit description items are filled in, together with items on the last line determined by the director.

Scoring covers the following deficiency items: 7-20; 21 and the unit components of 22-24 (with structure and unit scores totalled in the Penalty Score column); and items 26-30. Subtotal scores for facilities, maintenance and occupancy are struck, and Dwelling Total and Housing Total Scores are shown at the foot of the appraisal form. Basic deficiencies are checked and totalled in their special column.

At the director's option, entries for the Key to Sanitary Index⁴⁵ at the foot of the appraisal form may be checked.

These entries complete the Unit Appraisal Form as shown in Figure 9. The same example is shown (in relation to the scoring templates) in Appendix C-3, Figures C22, C23.

Supervision. Scoring operations should be checked early by the director to make sure that misunderstandings will not cause confusion or extra work later. Having familiarized himself with Appendix C-3, he should make

⁴⁵ Explained above in Section 2, footnote 42.

sure that clerks are following correct practice with respect to checking the Master Card entry for one unit in each structure; that descriptive items are being recorded for vacant dwellings or those otherwise incompletely scored; and that maximum scores shown on the templates are being observed for deficiency items 5, 22, and 24—for which a ceiling penalty value is specified, less than the possible total score for all subitems.

CODING

Coding for card punching is done on the Punching Code Sheet, attached to the Unit Appraisal Form (shown in Appendix C-3, Figure C24).⁴⁶ Deficiency items are coded by direct reference to scores on the appraisal form, as explained in the Office Procedures, but a separate Coding Guide is used for certain descriptive items and to designate punching for classes of total and subtotal scores. The Coding Guide is shown in Appendix C-3, Figure C13.

In preparation for coding the director should observe how high the dwelling scores are running in the poorest blocks. This will enable him if necessary to adjust the class ranges for punching the total and subtotal scores. Standard class intervals for these, given in the Coding Guide, should be used unless extraordinarily high scores are indicated, in which case it may be necessary to adjust the classes for facilities subtotal scores from a range of 10 points each to 15 points, or classes of Housing Total Scores from 20 to 25 or 30 points.

Supervision. Once the materials have been prepared and operations are understood by the clerks, there should be no problems other than those of accurate workmanship.

CARD PUNCHING

For each unit a card is punched according to its Punching Code Sheet. Some items for which the punching is virtually self-coded on the appraisal form (as district number and race of household) are not covered by the code sheet. Punching for these and all other items is shown on a special copy of the punch card called the Punching Guide (illustrated in Appendix C-3, Figure C14). This is used by the clerks until they are familiar with self-coding items, and it serves later as the definitive key to punch card positions during analysis. The Punching Guide will be adapted to local needs by the consultant.

Where machine cards are used, punching practice will of course be familiar to the regular punch operator, and details will be worked out with the consultant.

The four paragraphs below apply only to the use of marginal punch cards.

⁴⁶ The code sheet shown is designed for marginal punch cards. It can also be used with machine cards, or a special form can be laid out with the consultant. The code sheet is perforated for removal from the appraisal form after cards are punched, when its usefulness is ended.

ADMINISTRATION

The hand or keyboard punch, described in Appendix A-2, will be required. With the hand punch it is efficient to use a pair of clerks: one reading the values from the code sheet, the other punching and calling back the values as a check.

Supervision. The director should make sure that correct practice is being followed on the special punch of a Master Card for each structure, since this cannot easily be checked later in the same fashion as other punching.

It is particularly important for the director to check the accuracy of all punching for one or two blocks as early as possible. A systematic general check of punching is provided later, just before sorted cards are tabulated (when the check can be most efficiently made), but a preliminary check of early work is imperative for the following reason: errors in punching discovered later can be rectified by the use of standard correction pasters, but if too many of these occur they may change the thickness of the cards enough to distort the readings from the percentage scale described in the next chapter. Therefore it must be assured at the outset of punching that the clerks correctly understand the punching code and that their work habits are sufficiently accurate to reduce punching errors to a minimum.

The director should also make sure that slotting is centered on the holes with reasonable accuracy.

FILING, PREPARATORY TO ANALYSIS

As the last step in processing, the schedules, appraisal forms and punch cards are assigned to their permanent files. The schedules will not be used again except for special reference, and the file drawers containing them become inactive. Appraisal forms may, at the discretion of the director, be stapled to the Unit Schedules and filed with them, or separately in order by serial number.

4. Administration

Processing can be done block by block over any area large enough to permit efficient handling. Blocks need not be taken strictly in numerical order. If some have progressed more rapidly than others through the checking stages of data collection, they may be processed out of turn.

Since processing involves a series of routine operations, monotonous and tiresome when carried out at the pace good clerks can achieve, efficiency will be promoted by encouraging clerks to rotate among the various tasks as often as they find desirable.

CONTROL OF ACCURACY

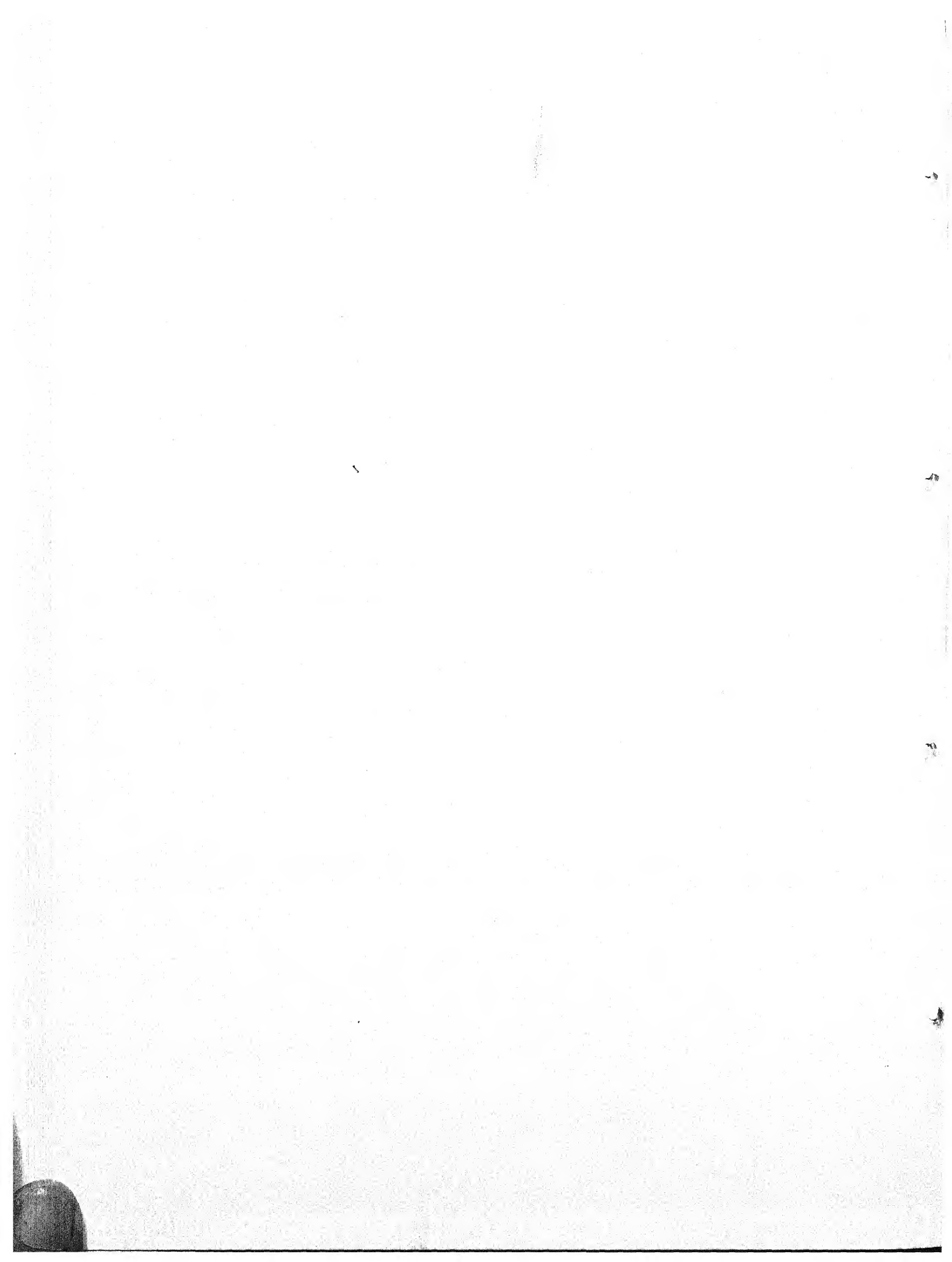
Specific responsibilities of the director are indicated under supervision of each operation described in Section 3. In the processing phase, accuracy is protected largely by having the clerk recheck her own work immediately after each operation, not by separate checking operations later as during data collection. The director will see that good practice in this matter is maintained.

The director or chief clerk will wish to make occasional spot checks on the accuracy of each operation.

REVIEW OF PROGRESS AND COST

Periodic reviews should be made of progress in relation to preliminary time estimates. For this purpose the consultant can give detailed time allowances for each step in processing, based on experience of previous studies.

If any operation is found to be taking much more time than estimated, the cure is usually a study of the clerks' work habits and manual coordination. Unlike data collection and analysis, processing does not permit substantial economy by reducing the number or content of operations.



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Chapter V

ANALYSIS AND INTERPRETATION

1. Introduction

The purpose of statistical analysis is to answer questions on which policy and action may be based. Under the present method of appraisal, such questions fall into three broad groupings. First, what is the character—qualitative and descriptive—of the total body of housing and families studied? Second, what are the important breakdowns of this body of cases: by area, by type of housing, by type of occupant? Third, how do related breakdowns compare with one another; and within each breakdown what is the quality of housing, what are the specific problems, and what are the indicated lines of action?

KEYS TO EFFECTIVE ANALYSIS

From the data produced by this appraisal method, dozens of tables and charts could be made, and temptation to over-refine the analysis must often be resisted. The plan of analysis to be described furnishes a guide to orderly and economical work, under which only the significant results will be sought. Broad findings will be disclosed first, and more refined study need be carried only so far as the purposes of a given study warrant. Before considering this plan in detail, four general principles which underlie effective analysis and presentation should be stressed.

1) *Concentration on significant breakdowns.* One secret of economy with data such as these is to discover at the outset those breakdowns with which substantial quality differences (and thus specific problems) are associated, and to concentrate analysis on those breakdowns. Under a scoring system, quality difference is readily disclosed, as a guide to more intensive analysis, by comparison of median or other characteristic scores. Quick tests for difference in housing quality (between areas, types of dwellings or the housing conditions of different population groups) are therefore made as the first step in analytic procedures of this method, to show which lines of study will be worth following.

2) *Manageable number of classifications.* In any series of analyses, comparisons should be made between a

small enough number of breakdowns so that tables, charts or maps will be understandable. In general, this means that cases should be classified into the largest groupings that will not conceal significant internal differences. For example, it would have been a difficult task to analyze or present results of the 1944 New Haven survey by tabulating the 60 appraisal areas individually, but by grouping these areas into five quality grades from A to E it was possible to present essential differences in compact tables and clear maps. The scoring system contributes to good practice in this respect because comparison of characteristic scores for subgroupings will warn against combining groups with undue degrees of difference.

3) *Standardization plus flexibility.* The scheme of analysis and presentation must be sufficiently standardized to assure comparability of findings from one area or study to another, but it should also be flexible enough to encourage detailed study of problems which are important (and to permit disregarding those which are unimportant) in a particular place. A scheme which calls for the same kind of tabulations for every city—or even for every district of one city—will either produce meager results overall or will waste effort in pursuit of meaningless data. A plan is presented here which gives essential results in comparable form but offers wide choice for special analysis of localized problems.

4) *Attention to form and mechanics.* Nowhere is systematic work and consistent form of materials more important than in tabulation and analysis. Correct practice here is not simply a matter of taste or neatness; it is imperative for good results. A logical sequence of tabulation, standard format and full titling of tables and charts, a clear scheme of identifying numbers for analytic materials, uniform checking and filing practice—these may seem like minor details, but they can make the difference between smooth work and chaos. Disregard of these mechanics can cause more confusion and delay than anything else that is likely to happen in a conscientiously organized study. The forms and procedures of this method have been designed to encourage good practice in all such matters.

ANALYSIS AND INTERPRETATION

PLANNING A LOCAL SCHEME OF ANALYSIS; THE CONSULTANT'S FUNCTION

If economy and sharp findings are to be combined as they can be with these data under the scoring system, the plan of tabulation and analysis must be adapted to the character of a given study. Various matters of detail can be settled only on the ground, and after the content and purposes of the study have been settled. The plan will be affected by such factors as the interests and authority of the sponsors, the number and types of areas studied, inclusion of local schedule items, inclusion or exclusion of rooming units, use of the complete or abridged environmental survey, and use of machine or marginal punch cards for tabulation.

These variables will affect numerous details of tabular layout and procedure, but not the principles of approach. The chief purpose of the present chapter is to set forth these principles, to illustrate the method of interpretation from results of typical studies, and thus to help the director visualize the emphases desirable in shaping analysis for his own study.

During the consulting period a plan of tabulation and analysis will be designed to meet the local requirements. The consultant will also supply a group of punch cards from earlier studies, selected for training purposes. Practice with these cards will familiarize the director and clerical staff—in advance of the field work of their own study—with the basic steps of analysis and interpretation, including card sorting, construction of tables and charts, and translation of findings into a program of action. In this way many of the problems to be expected in the locality can be anticipated, and practice can be gained in dealing with them, during the consultant's visit.

ADMINISTRATION; RESPONSIBILITIES OF THE DIRECTOR

Tabulations can be started when the first district or major area of the study has been processed, and much of the analysis can be carried out district by district as processing and tabulation for each is completed.

While the analytic phase will require the director's serious attention it is, administratively, a relatively simple stage of the work. Clerks are engaged in routine operations of card sorting and table construction (for which the local plan of tabulation will give an explicit guide), plus such production of charts, summary tables or study maps as may be delegated to them by the director.

A basic responsibility of the director is to coordinate the work of the dwelling and environmental survey staffs in matters of tabulation and preliminary charts or maps. In the final stages skilled drafting service (perhaps available from the staff of the environmental survey) must be secured for presentation maps, and stenographic assistance should be arranged if there is to be a written report.

This is the creative stage of the project, to which field work and the drudgery of processing are addressed. These previous efforts will have been wasted unless the findings are interpreted in a way which brings out the problems of concern to sponsors of the study. This is a perfectly feasible task, approached by systematic steps through which significant problems will be clearly revealed.

There is no magic or mystery about analysis, but the director's part in it cannot be done casually or when he is preoccupied with other matters. It is the director who must sense the leads opened up by this or that tabulation, who must determine when to refine the analysis and when to cut it off, who must himself explore the findings to select and rearrange and present them in most useful form. Not only must dwelling and environmental results be coordinated in the mechanical sense, but varying relationships between environmental and dwelling quality must be studied for their impact on remedial programs. Problems unforeseen in a given area or type of housing or among special population groups must be studied to see what they mean for purposes of action in a particular community.

Out of the wealth of findings which might be presented in a report, those of greatest value for local purposes must be chosen, packed down and presented in logical text and clear graphic materials. In short, the diligence and imagination of the director during this phase of the study will largely determine its usefulness and the value received by those who pay for it.

2. Plan of Tabulation and Analysis

The processed data of a survey are organized for purposes of analysis, mapping and interpretation by means of work tables, the layout and mechanics of which are explained in later sections of this chapter. A systematic basis for selecting the tables to be made is imperative for efficient work during the analytic phase. Procedures of tabulation have been developed for this appraisal method which combine standardization with needed flexibility as discussed in Section 1. The scheme provides a framework under which problems can be studied in logical progression from matters of broadest policy to specialized programs of individual agencies.

It will require a score of paragraphs to explain, step by step, the scheme of tabulation and table identification—leading up to a one-page summary of the scheme in Figure 13. It is suggested that any reader other than the seasoned statistician refrain from studying that figure until he has read the text that precedes it. Even the sophisticate might well do the same, for certain terms are used here with special meaning related to the data of this technique.

Effort devoted to mastering the explanation below should be well repaid. Once the scheme is under-

PLAN OF TABULATION AND ANALYSIS

stood, it will serve the director in at least three major ways. It gives a clear and succinct specification of the content of each table or chart, so that analytic materials desired can be quickly distinguished without reading their full titles and subtitles, which are necessarily cumbersome. It provides an almost foolproof guide to filing and record-keeping for complex and often elusive materials, and it integrates the findings of the environmental appraisal with those of the dwelling survey. Finally, it supplies the basis on which the director and consultant will agree on the tabulations to be made, and gives a system of shorthand symbols by which the director can pass on these decisions to his staff—covering both the content and sequence of work to be done—with a minimum of discussion or chance for misunderstanding.

The plan of table-making is built on three concepts: subject of tabulation, series of tabulation, and rank of tabulation.

SUBJECT OF TABULATION (DATA TO BE DISTRIBUTED)

Three broad types of data are produced by this appraisal: a) *descriptive information* concerning the types of dwellings and their occupants (unscored items such as rent and size of household); b) *measures of quality of housing* (penalty scores and data on the number of basic deficiencies); and c) findings on *types of deficiency* (specific conditions revealed under the 30 appraisal items). Nine separate kinds of information occur under one or another of these three headings, as explained in the following paragraphs. These nine kinds of information comprise the subjects of tabulation, and every work table is a distribution of the cases studied on the basis of one or another of these subjects.⁴⁷

a) *Descriptive information* gives the number and types of households, and the amount and character (aside from scoring factors) of housing. Under this heading three types of tables can be made, as follows:

Subject 1) Control Tabulation: this is a count of the numbers of blocks, dwellings, households, etc., included in the study, to show the number of cases covered by all later tabulations.

Subject 2) Description of Housing: tables on this subject give the distribution of dwellings by size of unit, class of rent, type of tenure and similar factors.

Subject 3) Description of Occupants: these tables give the distribution of households by size, race, class of income and other descriptive characteristics.

b) *Measures of quality* are given by penalty scores and the number of basic deficiencies. Tables include the following:

Subject 4) Total Scores: these tables give the broadest summary of quality (Housing Total Score) with

⁴⁷ The layout of tables for these subjects is shown in Appendix C-4. The purpose of all tables will be most readily understood, however, from the text in this section and from discussion of the corresponding charts, given in Section 5.

its subdivision into Dwelling and Environment Total Scores.

Subject 5) Number of Basic Deficiencies: tables on this subject show the distribution and extent of major substandard dwelling conditions, considered together.⁴⁸

Subject 6) Subtotal Dwelling Scores: the nature of deficiencies is more sharply indicated under this subject by distribution of subtotal scores for facilities, maintenance and occupancy.

Subject 7) Subtotal Environment Scores: these tables give distribution of subtotal scores for land crowding, nonresidential land use and other factors of the environmental appraisal, paralleling Subject 6 of the dwelling survey.

c) *Types of deficiency.* Tables in this group give the distribution of specific dwelling and environmental defects, revealing the exact nature of housing problems and pointing the way to specific remedial programs needed.

Subject 8) Dwelling Deficiencies: tabulations are made of exact conditions revealed under each of the 30 dwelling appraisal items.

Subject 9) Environment Deficiencies: similar tabulations are made for the 24 environmental appraisal items.

SERIES OF TABULATION (BASIS OF COMPARISON)

There are three bases for comparing the results obtainable under any subject of tabulation above. Comparison may be desired between areas, between types of housing or between groupings of the population. The primary series and two secondary series of tables provide for analysis on any of these three bases.

Primary series: comparison by geographic groupings. Results will universally be wanted in terms of areas: always for the survey area as a whole, and usually for geographic breakdowns such as districts comprising the total area or smaller appraisal areas comprising the districts. It is this type of analysis through primary tables which is most readily mapped to answer the questions: Where is the problem located? and How big is it? Primary tables were the source of all information in Chapter II of Part I.

Tabulations in the primary series, by geographic breakdowns, give comparability of the findings from one area or study to another. Primary tables are therefore usually made, by districts or subordinate appraisal areas, for each of the nine subjects of tabulations. These tabulations for parts of the survey area are finally totalled to give results for the entire study.

Secondary series: comparison by descriptive characteristics of housing or occupants. Two secondary series of tables provide for comparisons by type of housing (Secondary Series 1) or by type of occupants (Secondary

⁴⁸ The different types of basic deficiencies are revealed by tables under Subject 8.

ANALYSIS AND INTERPRETATION

Series 2). If, for example, a study covers dwellings with a range from low to moderately high rents, analysis of quality and of specific problems may be desired for dwellings grouped by rent, regardless of location. A table for this purpose would be specified from Secondary Series 1. Where intermixture of white and nonwhite families occurs within an area, analysis of housing conditions by racial grouping of the occupants may furnish a guide to remedial programs. Tables in Secondary Series 2 would provide such information.

The number and kinds of significant descriptive breakdowns may vary considerably from one district or study to another. Since general comparability of results is assured by primary analysis in terms of areal breakdowns, wide choice can be exercised in the secondary analysis by descriptive groupings. Different factors may be selected for analysis in different districts, depending on the descriptive characteristics revealed by tables under Subjects 2 and 3. In one district, for instance, analysis of quality or specific deficiencies might be wanted as between tenement and nontenement structures; in another district, with little intermixture of dwelling types, the secondary analysis might stress a comparison of overcrowding among small and large families, or it might consider the lack of selected facilities in various rent ranges.

No standard set of tables is specified for secondary analyses; here the director has complete freedom to make those tabulations which are significant for his purposes and to ignore all others. Thus while all of the primary tables will normally be desired, only a few of the tables possible in the two secondary series will usually be necessary.

RANK OF TABULATION (SIZE OF AREA TREATED)

In primary and secondary analysis alike, it must be decided whether data will be tabulated for the study as a whole or by parts of the area surveyed. This choice is expressed by designating the rank of each tabulation, which signifies the size of areas treated in the table.

In the primary series, the rank of a table is automatically determined by the geographic breakdowns shown in the columns of the table. Tables on the survey as a whole carry rank A; those which tabulate by major districts have rank B; tables which compare conditions among the smaller appraisal areas are of rank C.

In a secondary tabulation the rank is not determined by the meaning assigned to columns of the table, for here the columns are devoted to descriptive breakdowns of housing or occupants rather than to areal classifications.⁴⁹ Therefore the rank of secondary tables must consciously be selected and expressed as a separate step. A table may be made, for example, to compare condi-

tions in owned and rented dwelling units, with this breakdown the only one which shows in columns of the table. If the units thus compared are those of a single district, the table will carry rank B.⁵⁰ If punch cards for the entire study have been combined before breaking them down into owned and rented units, the rank of the table will be A.

THE TEST OF QUALITY DIFFERENCE (GRAPHIC PATTERN OF QUALITY)

Before considering the scheme of table identification, based on the classifications discussed above, one special use of the data should be briefly explained: the test of quality difference.

While there are only nine subjects of tabulation, a tenth subject is, in effect, created by a special use of the scores or measures of quality, discussed under subheading b), above. As indicated in Section 1 of this chapter, median or other characteristic scores are plotted as the first step in tabulation to determine whether important differences in housing conditions run with areas, with types of housing, or with groupings of the population. This test also shows how far the punch cards for blocks or other subgroupings of the cases can be combined into larger groupings of homogeneous quality, thus paving the way for economy in all later stages of analysis. This first step is called the test of quality difference, and is designated under subjects of tabulation as Subject 0.⁵¹ Since this special tabulation is made in the form of a graphic chart for quick interpretation, it is also referred to as a graphic pattern of quality.

TABLE IDENTIFICATION

The standard scheme for numbering tables, based on the classifications given above, is shown in Figure 13. Each subject of tabulation is identified by a subject key number at the left of the figure, and this key appears in the number of any table on that subject. Each subject may serve as the basis of tables in the primary series or in either of the secondary series (three columns at the right of Figure 13). Both the subject and the series of a tabulation are shown by the table number—the figure 1 being prefixed to the subject key number for a table in Secondary Series 1, and the figure 2 being prefixed to the subject key for a table in Secondary Series 2. No series symbol is expressed for a primary table, and the subject key alone constitutes the table number.

Numbers. Tables are numbered to show their content, not necessarily the sequence in which they are made. Thus, for example, any table which gives a distribution of total scores will always carry in its number the subject key 4. Such a table in the primary series,

⁵⁰ The same rank would apply if the table gave comparisons for two or more districts separately.

⁵¹ The test of quality difference is fully explained and demonstrated in Section 4.

⁴⁹ The use of columns in primary and secondary tables is illustrated in Figures 16 and 17, respectively.

PLAN OF TABULATION AND ANALYSIS

with geographic breakdowns, will be Table 4. In a secondary series its number will be 14 if the comparison is by types of housing; 24 if the comparison is by race, size of household or other descriptive characteristics of occupants.

Rank symbols. Rank of a table is expressed by suffixing to the table number one of the rank symbols previously explained, and repeated at the foot of Figure 13: A if the table treats the entire study, B if it tabulates by districts, or C if it compares smaller appraisal areas.⁵²

Examples. Under this scheme the subject, series and rank of a table are all evident from the table number and rank symbol. Examples of such identification are as follows:

- 4-C a table giving the distribution of total scores, by appraisal areas.
- 15-B a table giving the number of basic deficiencies by types of housing, by districts.

⁵² Rank D, which signifies a tabulation by individual blocks or sampling areas, is ordinarily used only for the test of quality difference, to delimit the areas for all later C or B rank tables.

- 28-A a table giving the distribution of individual dwelling deficiencies by types of occupants, for the entire survey.

Areas grouped by quality grade. When many appraisal areas or districts occur and it is desired to group these by quality grade (as was done in the New Haven findings of Part I) the symbol of rank is repeated. Thus the dwelling tables in Part I, for appraisal areas of grades A to E, were made from work tables of rank CC.

Special groupings of areas. If areas are given an arbitrary grouping for special purposes—as in Part I where contiguous appraisal areas were grouped for consideration as possible slum clearance districts—X is used as the suffix for rank of a work table.

Tables totalled to a higher rank. Several columns of a table may be used for tabulations of one rank, with the last column used for totalling to the next higher rank. In this case the suffix shows both ranks. For example, if a table shows data for the appraisal areas comprising a district, together with totals for the entire district, the rank symbol will be CB.

FIGURE 13. SCHEME OF TABLE IDENTIFICATION^a

Code Symbols Used to Show Subject, Series and Rank of Tables and Charts

SUBJECT OF TABULATION (Data to be Distributed): Shown by Subject Key in Table Number		SERIES OF TABULATION (Basis of Comparison):		
Subject Key		Primary Comparison by Geographic Breakdowns of Area	Secondary: Series 1 Comparison by Descriptive Breakdowns of Housing	Secondary: Series 2 Comparison by Descriptive Breakdowns of Occupants
0	<i>Graphic Pattern of Quality</i> Test of Quality Difference ^b	Chart 0	Chart 10	Chart 20
	<i>Descriptive Information</i>			
1	Control Tabulation	Table 1	Table 11	Table 21
2	Description of Housing	" 2	" 12	" 22
3	Description of Occupants	" 3	" 13	" 23
	<i>Measures of Quality</i>			
4	Total Scores	Table 4	Table 14	Table 24
5	Number of Basic Deficiencies	" 5	" 15	" 25
6	Subtotal Dwelling Scores	" 6	" 16	" 26
7	Subtotal Environment Scores ^c	" 7	" 17	" 27
	<i>Types of Deficiency</i>			
8	Dwelling Deficiencies	Table 8	Table 18	Table 28
9	Environment Deficiencies ^c	" 9	" 19	" 29

RANK OF TABULATION (Size of Area Treated):
Shown by Suffix to Table Number

Suffix	
A	Total Study Area (all districts combined)
B	District (a major subdivision of the total area)
C	Appraisal Area (a subdivision of a district)
D	Block (or other small area used for data collection)
X	Areas defined by any other special grouping desired

^a See text, "Table Identification," for examples of table numbering under this scheme.

^b Subject 0 is presented only in chart form. See text for explanation.

^c Tabulated from Block Appraisal Forms of environmental survey, not from Unit Punch Cards. Secondary tables are not ordinarily made for this subject.

ANALYSIS AND INTERPRETATION

SEQUENCE OF OPERATIONS

The normal sequence in preparing work tables for any district is as follows:

The primary test of quality difference (Chart 0) is made by blocks or sampling areas (rank D) to determine whether the district breaks down into appraisal areas or may be analyzed as a whole. Primary Tables 1-9 are then made for appraisal areas or for the district (rank C or B) as indicated by the test of difference. If tables of rank C are made, these are totalled for the district (rank CB). Tables for all districts are ultimately totalled to produce rank A tables for the survey as a whole.

Secondary tables will ordinarily be made district by district (rank B) immediately after the primary tabulations. They can, however, be made later of rank A for the entire study.

The sequence of tabulation is further explained in later sections of this chapter.

3. Primary Materials

All tables described in the preceding section must be prepared on the standard Tabular Form, to be described, in order to assure comparability of results and other advantages of standard format. Most tables call for percentage distributions of the data, and where the marginal punch card is used these tables can be prepared with great economy from the percentage scale developed by the Committee's staff. This device will be explained first, since it affects the organization of the Tabular Form.

CARD SCALING DEVICE (PERCENTOR)

Underlying principles. The instrument for scaling percentage distributions of data on marginal punch cards is based on factors which relate to the physical nature of these cards. So far as is known, these factors have been recognized and applied to statistical analysis for the first time in the course of developing this appraisal method.

FACTOR 1. The characteristics slotted in a pack of marginal punch cards are visible at the edges of the pack.

A group of cards slotted for the same position and viewed from above will present a continuous gap or void in the edge of the pack. This is visualized in Figure 12A of the preceding chapter. Taking such a void to represent the punching for class 1 of some item, and placing in front of the slotted cards those for class 0 of the same item (unslotted) the full pack of cards will look from above like Figure 14A.⁵³ The relative length of the void will be directly proportional to the percent of cards slotted for the item. In the example it is evident by inspection that the proportion of slotted cards is about one-half.

FACTOR 2. The thickness of a pack of cards can be

⁵³ Slotting and class values are explained in Chapter IV, Section 2.

divided into 100 parts by fitting a scale with 100 divisions (and longer than the thickness of the pack) diagonally across the pack, with point 0 of the scale at the front of the first card and point 100 at the back of the last card. This relation of scale and cards is shown in Figure 14B.

Each division of the scale measures 1 percent of the thickness of the pack. With cards in firm compression the scale will give a direct reading of the percent of cases in each punching class. In the example 47 percent of the cards are found to fall in class 0 (unslotted) and the remainder, 53 percent, in class 1.

FACTOR 3. When an item is slotted in two, three, or four positions, giving four to sixteen classes as explained in the previous chapter, the cards in these classes fall into order by class during the sort, with class 0 or 1 at the front of the pack and the class of highest number at the back.

This arrangement for a seven-class item is shown in Figure 15. Cards in class 1 present a void in position 1, and those in class 2 a void in position 2. Cards of class 3 show voids in positions 2 and 1, and so on to positions 4, 2 and 1 for class 7. The scale, locked at the angular setting shown, slides to the right, intersecting the voids and giving a percentage reading for each class in turn.

In this example (assuming scale movement to the right), class 1 is seen to contain 7 percent of the cases. Class 2, which reads from point 7 to 17 on the scale, contains 10 percent of the cases; class 3, reading from 17 to 35, 18 percent; and so on to 10 percent for class 7, which reads from point 90 to 100 on the scale.⁵⁴

Advantages. The time savings of this system over manual counts of the sorted cards are obvious. Even as compared to the rapid counts of a tabulating machine there is a labor saving worthy of note. With machine punch cards a count is commonly taken not for its own sake but as a step toward computing percentage distribution, since percentage comparisons are almost universally used to give comparability to larger and smaller bodies of data. Under this new approach not only the computation but the count itself is eliminated, and the desired result is produced in a single operation after sorting.⁵⁵

The use of scales with these cards has a further advantage. The class which contains the median value of a series need never be computed, but is read directly from the scale. In Figure 15 it is evident that when the scale is shifted to the right to intersect the slotting, the median

⁵⁴ Scales used are more sharply marked than in these illustrations, and readings can usually be interpolated to one decimal place.

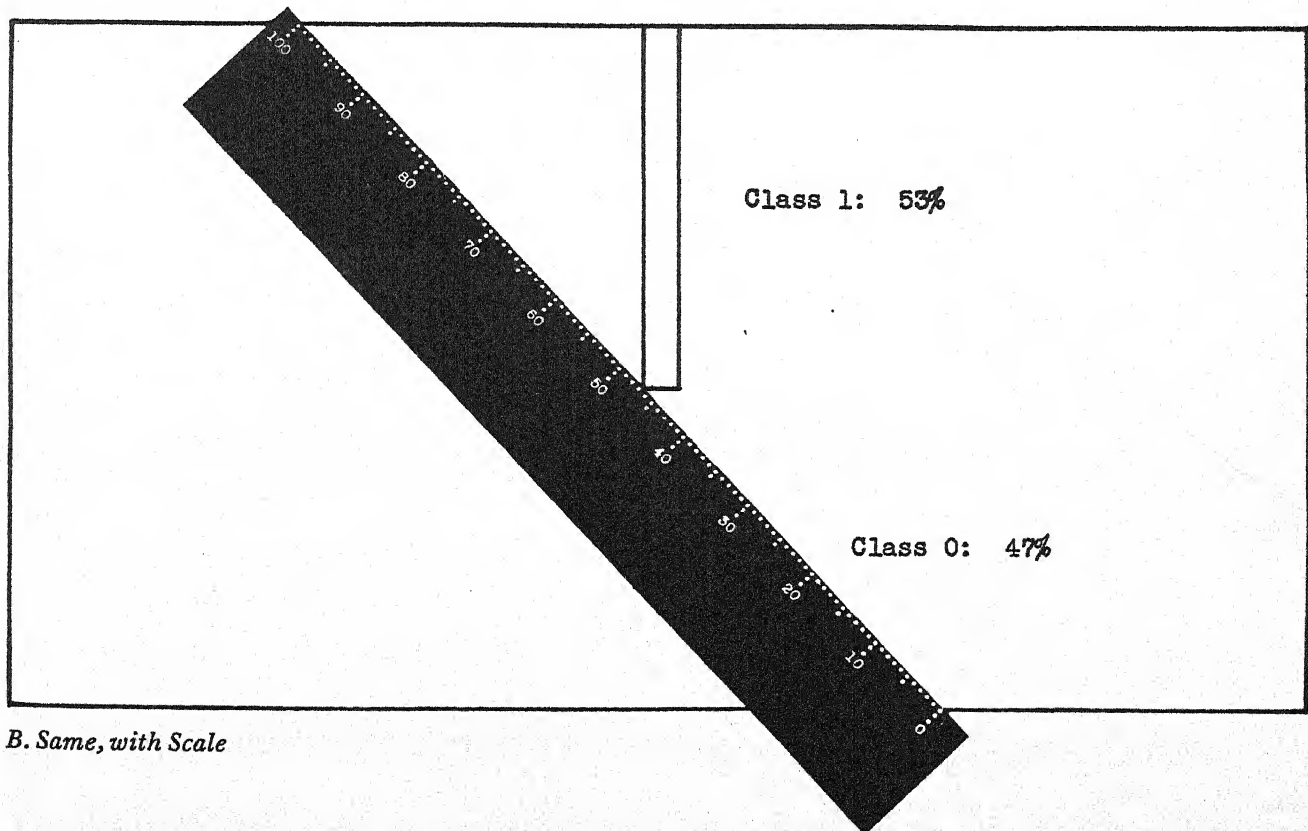
⁵⁵ A control tabulation or count of the total number of cards in each district or other grouping is made, of course, as the first step in analysis, for reference in later tabulations. If numerical distributions of cards in any sort are wanted in addition to percentage figures, they are readily approximated by calculation from the scale readings and the control count, which is transcribed routinely from the control tabulation to the head of each analytic table.

Position
1

Class 1: Slotted

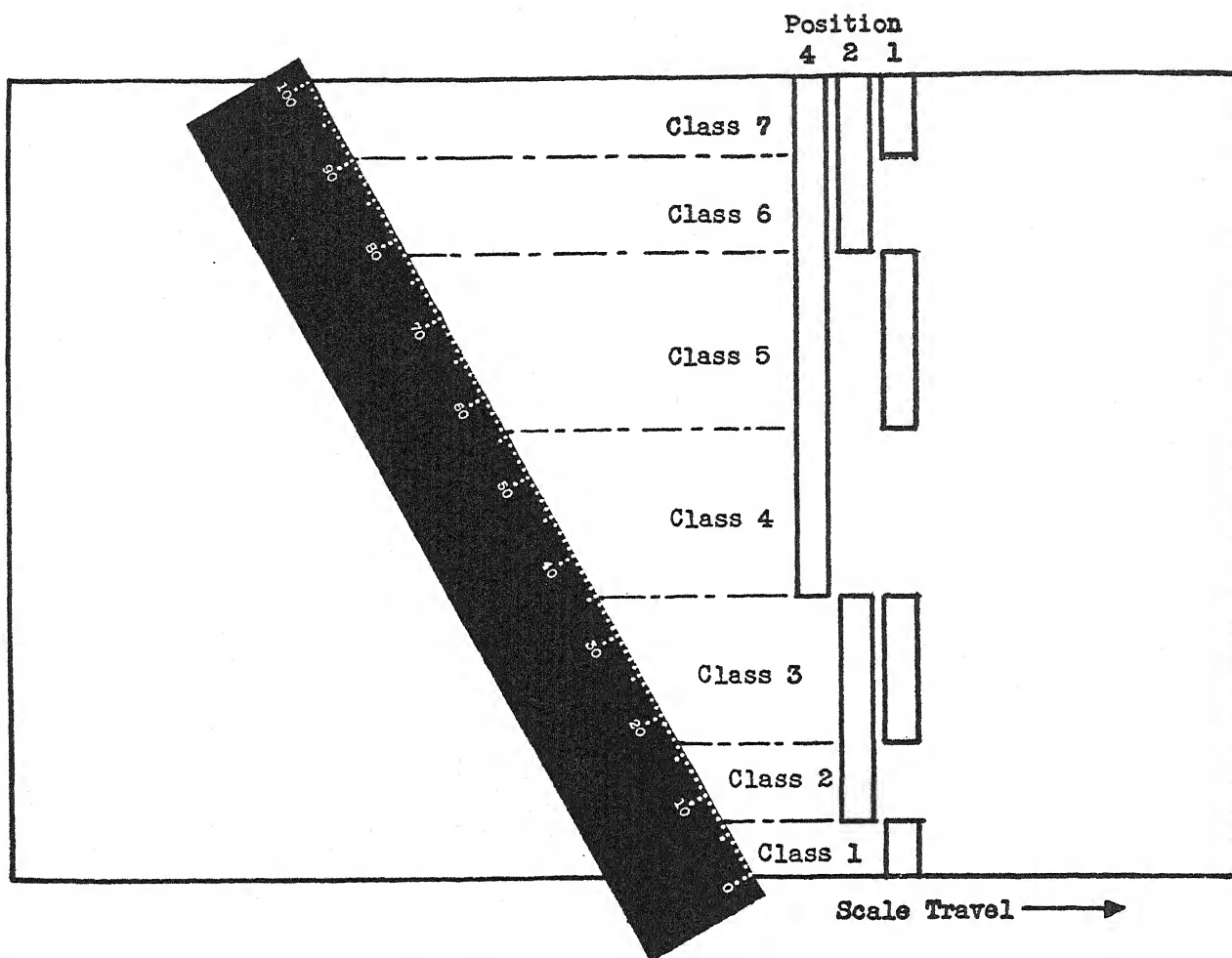
Class 0: Unslotted

A. Sorted Cards, Top View



B. Same, with Scale

FIGURE 14. PERCENTAGE SCALE WITH MARGINAL PUNCH CARDS: TWO CLASS ITEM



	PERCENT IN CLASS (percentage distribution)	SCALE READING (cumulative percent)
Class 7	10	100
Class 6	12	90
Class 5	22	78
Class 4	21	56
Class 3	18	35
Class 2	10	17
Class 1	7	7
	<hr/> 100	

FIGURE 15. PERCENTAGE SCALE WITH MARGINAL PUNCH CARDS: SEVEN CLASS ITEM

PRIMARY MATERIALS

(point 50 on the scale) will lie above the center of class 4, which will run from point 35 to point 56 on the scale. Similarly, the first quartile (point 25 on the scale) is seen to lie near the center of class 3, and the third quartile (point 75) is found close to the top of class 5. The range between quartiles, covering the spread of the middle 50 percent of cases, is a valuable comparative index in many series of data. Since the scale makes it easy to determine this range, it is plotted as standard practice on most of the work tables. This gives a most useful graphic indication of trends among the groups of data, as will be explained in connection with Figure 17.

Working characteristics of the device. The principles set forth above have been embodied in a simple instrument which has been used by the Committee staff in several studies and will be manufactured commercially by the makers of the marginal punch cards—under the trade name of Percentor.

Interchangeable scales of different length permit readings with batches from 100 cards or less to a maximum capacity of about 1,000 cards. Larger groups of cards can be readily handled by breaking these down into uniform batches within the capacity of the scale, and by averaging the scale-readings for all batches.

Accuracy of the results depends primarily on two factors: uniformity of compression and the sharpness with which the operator reads the scale. Experience in the Committee's office over many months, using an amateur model of the device, has been satisfactory on both these points.

In such a case as that of Figure 15, where several hundred cards are sorted for a multi-class item, tests have shown that errors due to uneven compression need not exceed 0.3 to 0.5 percent in the distribution to any class. Such errors will commonly be limited to two classes of the series, slight under-compression in one class being offset by over-compression in another. The distribution of all classes will always total correctly to 100 percent, and internal errors of the small magnitude indicated are insignificant for most analytic purposes. Preliminary tests of a factory model of the Percentor indicate that even better accuracy may be achieved with the improved compression arrangements of a machine-made instrument.

The sharpness of scale-reading increases as the size of the batch and the length of the scale-divisions (and hence the ease of interpolation) increases. An error of one card thickness (which a careful operator need seldom exceed) is 1 percent of 100 cards, but only 0.1 percent of 1,000 cards. With all but the smallest batches of cards, therefore, errors in scale-reading should tend to be less than those which result from uneven compression. The two types of error may, of course, be cumulative, but they are quite as likely to offset each other.

STANDARD TABULAR FORM

A Tabular Form has been designed to provide a standard yet adaptable base for all tables needed, and to encourage good practice on the part of those unskilled in table making. The form is particularly adapted to scale readings from the marginal punch card, but should be used also with machine tabulation.

Preparation of tables on the standard form helps to assure that these analytic materials will be consistently organized, completely identified, properly checked, and fully comparable from one area or study to another. These attributes are essential if advice is sought by mail from the Committee's staff on matters of interpretation during the analysis of findings.

Organization of the form. As shown in Figure 16, the heading specifies the exact content of each table and its date, authorship and identifying number—points too often overlooked with the result of needless confusion and wasted time for those who use the tables. Six column-groups⁵⁶ in the body of the form can be used for six areas or other groupings of the data—or for five such groupings and totals for the five. Condensed tabulations for as many as 18 areas (or other groupings of the data) can be made on one sheet of the form by using one column instead of a column-group for each area. For this purpose the two entry lines in the column-group heading are repeated in the individual column-heading.

In work tables, columns d, c and m of a column-group carry percentage distributions, cumulative percentages and median values respectively, as will be explained.

The stub, bordered by double rules, carries 16 entry lines, permitting tabulation of scores or other values in the 16 classes provided by a 4-position field on the marginal punch card.

The form is punched at the left end for filing in an 8½ x 11 inch three-ring binder.

Specimen entries. Figure 16 illustrates the use of the form for standard work tables. In this example the first column-group has been used to transcribe the readings from the punch cards shown in Figure 15. These hypothetical readings are assumed to represent distribution of households by seven classes of monthly income, as shown in the stub of the table.

CUMULATIVE PERCENTAGES. Column c (center of the column-group) carries the readings from the scale, or cumulative percentages. On the line for each class of income is entered the scale reading at the top of that class (see Figure 15 for these values). The reading for the highest class, which runs to the end of the scale, is always 100.

DISTRIBUTION INTO CLASSES. Column d gives the percent of cases in each class, or percentage distributions. These entries are made by subtraction in the following

⁵⁶ Terminology of the Tabular Form is given in greater detail in Appendix C-4, Figure C26.

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DESCRIPTION OF OCCUPANTS of Dwelling Units:

SHEET SPECIMEN

TABLE S-B

Percent of households with monthly income in stated class

STUDY	SPECIMEN
1	1
2	2
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86	86
87	87
88	88
89	89
90	90
91	91
92	92
93	93
94	94
95	95
96	96
97	97
98	98
99	99
100	100

Readings RB Entries FJL Date 3/1/45

[illegible]

Tabular Form DS-6: 1944, Committee on Hygiene of Housing, APHA

FIGURE 16. TABULAR FORM WITH SPECIMEN ENTRIES FOR WORK TABLE

manner: from the column c value for any class, the column c value of the next lower class is subtracted, and the remainder is entered as the column d value for the higher of the two classes. For the lowest class, zero is subtracted from the column c value; its c and d values are always identical. Entries in columns d are always checked by addition to make sure that the values total to 100 percent. Reference to Figure 15 will show how the column d values express the distribution into classes.

With machine tabulation, the count of cards for each class is recorded (with the total) in column c, and percentage distributions are entered in column d by calculation. Under this scheme, however, the cumulative values, automatically provided by the scale and often useful in making charts or maps, require additional computations and special entries.

MEDIAN AND RANGE BETWEEN QUARTILES. The figures in column d are those desired for the usual presentation tables or charts, but column m provides a feature of

value in many types of analysis. As illustrated in Figure 16, a range graph in column m shows (by crossbar) the class containing the median value for each column-group and (by length and position of the vertical bar) the range of the middle 50 percent of cases from quartile to quartile. Median and quartile locations are read directly from the scale by noting the classes of punching which fall beneath points 50, 25 and 75 of the scale as explained above.⁵⁷

57 These entries could be plotted from the column *c* values after the scale reading. In Figure 16 for instance, it is evident that the first quartile would fall approximately in the middle of class 3, which runs from 17 to 35 on the scale (note that the figure 35 for class 3 in column *c* is the value at the *top* of class 3). Similarly, the median will fall above the middle of class 4, which runs from 35 to 56 on the scale. The third quartile, in class 5 (which covers 22 points—56 to 78—on the scale), will fall approximately 1/7 of the distance (3/22) from top to bottom of the class.

Such approximate determinations of median and quartile positions in a class are sufficient for many purposes, but where exact values are desired, these can be computed in the standard fashion from values in column c and the corresponding class values of the table stub. The method for this is given in Appendix C-4.

PRIMARY MATERIALS

DISTRIBUTION OF FACILITIES SCORES: By Class of Rent:

SHEET 1 of 1

TABLE 16-X

Percent of scored dwelling units with score in stated range, Appraisal

STUDY 1944 NEW HAVEN HOUSING SURVEY

Areas of Dwelling Quality Grades D and E Combined, All Districts

Readings RO Entries RL Date 4/12/44

Monthly Rent		\$10 - \$14.9			\$15 - \$19.9			\$20 - \$24.9			\$25 - \$29.9			\$30 - \$39.9			Owner-Occ.		
Percent of Scored D. U.*		20.0%			28.6%			18.9%			8.9%			2.4%			17.8%		
Class	FACILITIES SCORE	d	c	m	d	c	m	d	c	m	d	c	m	d	c	m	d	c	m
11	100 - 109 points	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	90 - 99 "	18.0	100	-	5.3	100	-	1.3	100	-	-	-	-	-	-	-	1.2	100	-
9	80 - 89 "	16.7	82.0	-	5.7	94.7	-	0.4	98.7	-	4.7	100	-	-	-	-	1.3	98.8	-
8	70 - 79 "	19.3	65.3	-	7.8	89.0	-	2.1	98.3	-	-	-	-	-	-	-	0.5	97.5	-
7	60 - 69 "	17.5	46.0	-	11.2	81.2	-	3.2	96.2	-	6.9	95.3	-	-	-	-	9.0	97.0	-
6	50 - 59 "	14.2	28.5	-	18.7	70.0	-	14.9	93.0	-	1.2	88.4	-	4.7	100	-	7.8	88.0	-
5	40 - 49 "	8.1	14.3	-	21.3	51.3	-	19.1	78.1	-	8.2	87.2	-	4.8	95.3	-	12.0	80.2	-
4	30 - 39 "	4.4	6.2	-	15.5	30.0	-	22.0	59.0	-	28.1	79.0	-	9.5	90.5	-	18.4	68.2	-
3	20 - 29 "	1.8	1.8	-	11.3	14.5	-	27.0	37.0	-	20.9	50.9	-	19.1	81.0	-	16.8	49.8	-
2	10 - 19 "	-	-	-	3.2	3.2	-	9.2	10.0	-	24.0	30.0	-	38.1	61.9	-	26.3	33.0	-
1	1 - 9 "	-	-	-	-	-	-	0.8	0.8	-	6.0	6.0	-	19.2	23.8	-	6.7	6.7	-
0	0 "	-	-	-	-	-	-	-	-	-	-	-	-	4.6	4.6	-	-	-	-
Total		100.0	-	-	100.0	-	-	100.0	-	-	100.0	-	-	100.0	-	-	100.0	-	-

*3.4% of scored D.U. have rent below \$10, over \$40, or rent not reported.

Tabular Form DS-6: 1944, Committee on Hygiene of Housing, APHA

FIGURE 17. SPECIMEN WORK TABLE WITH RANGE-GRAPHS

WORK TABLES WITH GRAPHIC QUALITY

Figure 17 is a complete work table, with entries as described above. In this example, taken from secondary tables (Series 1) of the 1944 New Haven survey, the purpose is to analyze the physical quality of dwellings (as measured by facilities subtotal scores) in relation to rent paid. Rent classes and the percent of dwellings in each are given in the column-group headings, and owner-occupied dwellings are shown at the right of the table for comparison.

This is the full record of punch card readings, intended for reference by the survey staff only, and the tabular data are relatively complex. The range-graphs, however, reveal the trend across the sheet even before the table is studied. It is instantly apparent that the quality of dwellings improves (penalty scores diminish) in normal fashion as rent increases, but that in these low-grade areas the owner-occupied dwellings are poorer than homes in the two highest rental brackets. A con-

fused or generally abnormal trend would of course be equally apparent.

CHARTS FROM WORK TABLES

The work tables described above give a complete record of punch card data, and provide the basis from which various types of analysis and interpretation can be made as needed. These tables are too detailed, however, for presentation and are intended for use only by the survey staff. The first step toward presenting the findings is ordinarily to prepare charts from the work tables. Charts permit selection, condensing and grouping of the data in form for easiest understanding, and give findings the force which comes from graphic presentation.

Effective charts can often be made directly from the tables simply by transcribing the range-graphs onto separate sheets of the standard form, without the tabular data. This has been done in Figure 18, where range-

ANALYSIS AND INTERPRETATION

FACILITIES SCORES BY CLASS OF RENT: Slum and Substandard Areas:

SHEET 1 of 1

CHART 16-X

Median value and range of middle 50% of cases, scored D.U. in all

STUDY 1944 NEW HAVEN HOUSING SURVEY

appraisal areas of dwelling grades D and E combined, by class of rent

Readings Entries RL Date 6/13/44

Monthly Rent		\$10 - \$14.9			\$15 - \$19.9			\$20 - \$24.9			\$25 - \$29.9			\$30 - \$39.9			Owner-Occ.		
Percent of Scored D. U.*		20.0%			28.6%			18.9%			8.9%			2.4%			17.8%		
Class	FACILITIES SCORE	d	c	m	d	c	m	d	c	m	d	c	m	d	c	m	d	c	m
11	100 - 109 points	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	90 - 99 "	-	87	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	80 - 89 "	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	70 - 79 "	-	-	73	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	60 - 69 "	-	-	-	-	62	-	-	-	-	-	-	-	-	-	-	-	-	-
6	50 - 59 "	-	58	-	-	-	48	-	-	-	-	-	-	-	-	-	-	46	-
5	40 - 49 "	-	-	-	-	-	48	-	-	-	-	39	-	-	-	-	-	-	-
4	30 - 39 "	-	-	-	-	37	-	-	38	-	-	30	-	-	26	-	-	53	-
3	20 - 29 "	-	-	-	-	-	-	25	-	-	-	-	-	-	17	-	-	-	-
2	10 - 19 "	-	-	-	-	-	-	-	-	-	-	-	-	-	11	-	-	18	-
1	1 - 9 "	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0	0 "	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*3.4% of scored D.U. have rent below \$10, over \$40, or rent not reported

Tabular Form DS-6: 1944, Committee on Hygiene of Housing, APHA

FIGURE 18. SPECIMEN CHART PREPARED FROM WORK TABLE

graphs of Figure 17 are shown with computed values of median and quartile scores. Here, as in all charts, the column designations d, c and m are ignored. Other types of charts provided for by the Tabular Form are shown and interpreted in later sections of this chapter.

The Tabular Form should be used at least for all preliminary drafts of charts. Standard format and comparability are thus assured, and filing arrangements for tables can serve for graphic materials as well.

The director will wish to make freehand or other rough charts from various work tables for his own interpretation, along lines to be illustrated in later sections of this chapter. Charts which prove of greatest value can be copied later in finished form for inclusion in a formal report.

IDENTIFICATION OF CHARTS

A chart carries the same number and symbol of rank as the table from which it is prepared.⁵⁸ Thus if some

items of a table are omitted from a chart, the director or other user of the chart always knows that he may find the complete data in a work table of the same number. For instance, Chart 3-B might show households by three size classes only, to emphasize the distribution of large, medium and small families. From such a chart it would not be possible to determine the number of two-person or six-person households separately, but this information could be instantly located by reference to Table 3-B, where households would be shown by the 15 size classes of the punch card.

4. The Test of Quality Difference

The test of quality difference or graphic pattern of quality is basic to economies of analysis under the pres-

⁵⁸ A chart is distinguished from a table both by its obviously different form and by the word Chart instead of Table in the upper right-hand corner of the sheet. The appropriate space is left blank on the Tabular Form, and is filled in by typewriter in laying out each table or chart.

THE TEST OF QUALITY DIFFERENCE

SHEET 11 of 16 Areas 1-93 CHART O-D

STUDY 1944 NEW HAVEN HOUSING SURVEY

Readings	RL	Entries	RO	Date
				4/12/44

Sampling Area	Area 61			Area 62			Area 63			Area 64			Area 65					
Dwelling Units: 1940 Census	140 DU			113 DU			179 DU			187 DU			300 DU*					
Score: Dwlg, Facil, Occupancy	Dwlg	Fac	Occ	Dwlg	Fac	Occ	Dwlg	Fac	Occ	Dwlg	Fac	Occ	Dwlg	Fac	Occ			
PUNCHING CLASS OF MEDIAN SCORE	d	c	m	d	c	m	d	c	m	d	c	m	d	c	m	d	c	m
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Class 9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" 8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" 7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" 6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" 5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Punch-checked	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Assigned to Appraisal Area	42			42			43			43			44					

*Housing project, built since 1940 Census

Tabular Form DS-6: 1944, Committee on Hygiene of Housing, APHA

FIGURE 19. PRIMARY TEST OF QUALITY DIFFERENCE: NEW HAVEN

ent plan. Since it has no counterpart in analysis under a nonscoring system, it calls for special explanation. Application of this test to primary analysis is illustrated below, and its use in the secondary series will be demonstrated in Section 6.

PURPOSE

In primary analysis the purpose of the test of difference is to permit combining all contiguous blocks (or sampling areas) of essentially similar quality into larger appraisal areas before making general tabulations. This is the first step toward exploiting the economies of scoring. Where groups of blocks show similar indices of quality, general tabulations need never be made by individual blocks as is customary with housing data. When blocks are combined only after the test for quality difference, there is assurance that median or other values for the appraisal areas thus defined will not conceal significant internal variations. In the case of gener-

ally homogeneous neighborhoods, the test may even show that a district can be analyzed as a whole, without subordinate appraisal areas.

METHOD

The test is made by plotting for each block or sampling area the median values for selected scores. This is illustrated in Figure 19 with an example from the New Haven study described in Part I. In this case the test is made in terms of dwelling conditions alone, leaving environmental quality as an independent variable. The factors of test are Dwelling Total Score, facilities score and occupancy score.⁵⁹ Sampling areas, consisting

⁵⁹ Omitting environmental scores from the test puts emphasis on dwelling deficiencies, for which many groups of sponsors will have more definite remedial powers than for environmental problems. Designation of appraisal areas on this basis does not mean, however, that environmental conditions will be overlooked in later analysis, for of course they will be tabulated and mapped in the regular way for all areas delimited by the test.

A test including environmental scores will also be shown.

ANALYSIS AND INTERPRETATION

of several blocks each, are the areal units to be tested.

Since the purpose is to justify the discarding of small areas for all general analysis, there would be no point in making complete tables of the scores for these areas. The graphs therefore show only the punching class of the median value for each factor of the test. This class is recorded by a crossbar in the corresponding class of the Tabular Form, and the crossbars are connected by heavy lines to show quality relationships in pattern form.⁶⁰

Recording the test in this graphic form gives a series of shapes which are easily compared for the purpose of combining minor areas into homogeneous larger groupings. Contiguous blocks or sampling areas are shown as far as possible in adjacent column-groups of the Tabular Form to facilitate the reading of valid combinations. The count of units at the head of each column-group permits de-emphasis of pattern variations in small areas.⁶¹

INTERPRETATION: A DISTRICT WITH PRONOUNCED INTERNAL DIFFERENCE

Even without understanding of the factors involved, it would be apparent from the patterns of Figure 19 that some kind of similarity and difference has been sharply expressed. Knowing the purpose of the test, it is instantly apparent that sampling areas 61 and 62, with patterns of identical shape and class range, can be combined into one appraisal area. Areas 63 and 64, with closely similar patterns, can also be combined. While area 65 has the same shape of pattern as 61 and 62, it falls in a slightly better part of the range. Slight differences in relatively good dwellings are more important than in poor ones, and area 65 should be kept as a separate appraisal area.⁶²

⁶⁰ The class of median score is quickly determined from marginal punch cards by sorting cards for the factor of test, breaking the pack into two even piles, and noting the class punched on the two cards which show on either side of the break. If the break occurs between two classes, the crossbar is placed between these classes on the Tabular Form; otherwise, placement in the center of a class is usually accurate enough for purposes of the test. The scaling device is not needed, and several clerks can work on this test simultaneously.

⁶¹ Because this test is graphic rather than tabular in form, the sheets of Tabulation 0 are identified as charts. Unlike the charts mentioned earlier, these do not summarize other tables. Charts O-D are considered a part of, and can be filed with, the primary series of work tables.

⁶² The reader may note that in areas 63 and 64 the class of facilities score is higher than that of the dwelling score, and it may be asked how the subtotal (facilities) can be greater than the total (dwelling). The absolute score for facilities of course cannot exceed the dwelling score which includes it. The apparent violation of this fundamental relationship is due to the fact that indications are of *punching class*, not *absolute score*. Facilities scores are punched in 10-point classes, dwelling scores in 20-point classes. Facilities scores will therefore appear in a higher class than dwelling scores whenever they account for substantially more than half of the Dwelling Total Score—which is the meaning of the peaks in the patterns for areas 63 and 64. For the other three areas it is evident from the graphs that facilities scores, in the same class as dwelling scores, account for approximately half the total. Each graph can thus be interpreted for shape as well as by position on the sheet.

When the test has been interpreted, the numbers of appraisal areas thus created are recorded at the foot of the Tabular Form. Punch cards are then regrouped accordingly, and positions reserved for the purpose are punched with these new numbers as the basis for all later handling of the cards.

It may be of interest to note that Figure 19 shows the test of difference for the generally excellent housing project discussed in Part I and for the grade B area and part of the slum which surround the project.⁶³ Areas of such variety, giving sharp breaks in the quality pattern, are useful as a first demonstration of the test, but interpretations must also be made of areas with subtler quality differences. An example of this type will therefore be considered.

INTERPRETATION: A DISTRICT WITH MODERATE INTERNAL DIFFERENCE

Figure 20 shows the pattern of quality for blocks comprising the first district of a study in progress in Los Angeles at the time of writing.⁶⁴ Here housing, dwelling and facilities scores are taken as the factors of test, and median scores are plotted for blocks (this study covers all dwelling units, and designation of sampling areas was not necessary). The graphs are condensed to permit plotting as many as 18 blocks on a sheet—a device which can be used as standard practice. Environment scores are not plotted separately, but they can be read as the difference between dwelling and housing scores. In other words, a long line and a steep slope between the Dwelling Total Score in the center of a column and the Housing Total Score at the left of the column will denote poor environmental conditions.

Although differences in this case are not so sharp as in the previous illustration, three potential appraisal areas can be recognized: blocks 2-5; blocks 6, 7 and 13; and blocks 15-27.⁶⁵ These areas are more sharply distinguished if environmental conditions are considered than if dwelling and facilities scores are taken alone, but definite breaks appear on either basis. Isolated differences in environmental conditions, as in blocks 17 and 27, would obviously not justify creation of separate appraisal areas.

If this were the only district to be studied, the three appraisal areas would probably be designated and primary analysis of rank C would be based on them. Other districts are to be surveyed, however, and it is

⁶³ These three appraisal areas can be located in Figure 3 of Part I by reference to the appraisal area numbers appearing at the foot of Figure 19.

⁶⁴ The study is a joint project of the Los Angeles City Health Department, City Housing Authority and City Plan Commission.

⁶⁵ Numbering is such that blocks in the three groups cited are contiguous and would form compact appraisal areas. For large districts, where the pattern of contiguous blocks cannot readily be interpreted from graphs on the Tabular Form, maps may be used in the test of quality difference, as explained in Appendix C-4, Section D.

THE TEST OF QUALITY DIFFERENCE

PRIMARY TEST OF QUALITY DIFFERENCE: by Block:

SHEET 1 of 1 District 1 CHART 0-D

Housing, Dwelling and Facilities scores; punching class of median

STUDY 1945 LOS ANGELES JOINT SURVEY

for dwelling units with scores complete

Readings BCA Entries RLB Date 3/23/45

Block	2	3	4	5	6	7	13	15	16	17	18	23	25	26	27			
Scored dwelling units	43	93	102	120	54	83	20	77	70	29	8	6	2	12	15			
Score: Housing, Dwelling, Facil.	HDF	HDF	HDF	HDF	HDF	HDF	HDF	HDF	HDF	HDF	HDF	HDF	HDF	HDF	HDF			
PUNCHING CLASS OF MEDIAN SCORE	d	c	m	d	c	m	d	c	m	d	c	m	d	c	m	d	c	m
Class 14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" 13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" 12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" 11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" 10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" 9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" 8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" 7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" 6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" 5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Punch-checked	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Assigned to Appraisal Area

No subordinate appraisal areas designated: District 1 tables to be made of rank B

Tabular Form DS-6: 1944, Committee on Hygiene of Housing, APEA

FIGURE 20. PRIMARY TEST OF QUALITY DIFFERENCE: LOS ANGELES

expected that differences between districts will be considerably greater than those within this first district. Designation of separate appraisal areas was therefore considered an unjustified refinement and the district will be studied as a whole, with dwelling tabulations of rank B.⁶⁶ Even under the other decision 15 areal units would have been reduced to three, with proportionate saving in all later stages of analysis. This saving is reflected not only in time needed for tabulation, but also in effort required to interpret findings for the reduced number of areas.

The reason why Figure 19 showed a smaller ratio of combination and saving (five areas reduced to three) may call for explanation. Where sampling areas are used, these will usually have been delimited before enumeration so as to include the largest groups of blocks which appear from the Census block data to be gener-

⁶⁶ The environmental survey staff will map environment scores by blocks or frontages, and the internal variation of environmental conditions shown in Figure 20 will not be overlooked.

ally homogeneous. With such sampling areas, therefore, the test of difference is merely a recheck to permit combinations which were not clearly justified in bounding the areas originally.

When it is found that separate appraisal areas need not be created within a district, as in the case of Figure 20, the saving may go even beyond elimination of rank C tabulations in the primary series. Primary tables of rank B for Subjects 1-9 can often be derived from secondary series tables on the same subjects, and card sorting for these primary tables can be avoided altogether.

Details of this procedure with marginal punch cards are set forth in Appendix C-4, but the method is illustrated by the following example.

Descriptive Table 2-B for this Los Angeles district shows that over one-fourth of the dwelling units are located in alley or rear yard structures. A secondary test of quality difference for these rear units and for units having a normal relation to the street may be

ANALYSIS AND INTERPRETATION

GRAPHIC PATTERN OF QUALITY: Summary of Findings:

SHEET 1 of 1

CHART O-B

Housing, Dwelling and Facilities scores; median value, dwelling

STUDY 1944 THREE-CITY COMPARISON

units and rooming units with scores complete, by district

Readings Entries DEF Date 11/23/44

District Scored DU and RU	District 1 383 units			District 2 744 units			District 3 427 units*											
Score: Housing, Dwelling, Facil.	Hsg	Dwlg	Fac	Hsg	Dwlg	Fac	Hsg	Dwlg	Fac									
SCORE: POINTS	d	c	m	d	c	m	d	c	m	d	c	m	d	c	m	d	c	m
200 points or more	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
190 - 199 points	192	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
180 - 179 "	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
140 - 159 "	-	-	-	144	-	-	-	-	-	-	-	-	-	-	-	-	-	-
120 - 139 "	-	141	-	-	-	-	125	-	-	-	-	-	-	-	-	-	-	-
100 - 119 "	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
80 - 99 "	-	-	94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
60 - 79 "	-	-	-	-	75	-	-	-	-	-	-	-	-	-	-	-	-	-
40 - 59 "	-	-	-	-	-	42	-	53	-	-	-	-	-	-	-	-	-	-
20 - 39 "	-	-	-	-	-	-	-	-	27	-	-	-	-	-	-	-	-	-
0 - 19 "	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*25% sample of 1720 units; other districts complete coverage

Tabular Form DS-6: 1944, Committee on Hygiene of Housing, APHA

FIGURE 21. THREE-CITY COMPARISON: GRAPHIC PATTERN OF QUALITY

expected to show greater quality variation between these groupings than appeared in Figure 20 under the primary test by blocks. If this occurs, secondary tables of dwelling scores and deficiencies will be wanted for all units of the district under a two-part breakdown for street and rear location. Punch cards will be sorted, scaled and tabulated accordingly. After each secondary tabulation, cards in these two groups can be combined by classes and rescaled for the corresponding primary table on the district as a whole. Most primary tables of rank B will thus be produced without sorting cards separately for them.

5. An Example of Primary Analysis

The first step in primary analysis, the test of quality difference, has been shown by examples in Section 4. Further stages are demonstrated in the present section, and the approach to secondary analysis will be illustrated in Section 6.

SCHEME OF ILLUSTRATIVE MATERIALS

Findings from three cities recently studied will be used, taking one small district from each of the cities. District 1, the poorest, is located in a large middle Atlantic city; the others are taken from cities of less than a quarter-million population in the Northeast. The cities are not further identified because the districts selected are not necessarily typical of their low-grade areas generally.

The districts will be treated as though they occurred in a single city, and analysis will be in terms of rank B charts or tables. Totals for these districts in scattered cities would be meaningless, and no interpretations of rank A will be made. Analysis will be based primarily on charts prepared from work tables. Some charts are omitted, since the purpose is not to show every detailed conclusion that could be drawn but to indicate the general method of attack and the sequence of interpretation.

AN EXAMPLE OF PRIMARY ANALYSIS

CONTROL TABULATION: Dwelling Units and Rooming Units:

SHEET 1 of 3

TABLE 1-B

Number of units by source of data, with status of scores, by district

STUDY 1944 THREE-CITY COMPARISON

Readings CBA Entries DEF Date 11/23/44

District	District 1			District 2			District 3											
Type of Unit/Punch-checked	DU	RU	All	DU	RU	All	DU	RU	All									
ITEM	d	c	m	d	c	m	d	c	m	d	c	m	d	c	m	d	c	m
A: UNITS: PUNCH CARDS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1) Scores complete	375	8	383	734	10	744	427	-	427	-	-	-	-	-	-	-	-	-
2) Scores incomplete*	18	-	18	23	-	23	8	-	8	-	-	-	-	-	-	-	-	-
3) Total	393	8	401	757	10	767	435	**	435	-	-	-	-	-	-	-	-	-
Punch-checked	✓	✓		✓	✓		✓			-	-	-	-	-	-	-	-	-
B: UNITS: DWELLING SERIAL LIST	-	-	401	-	-	767	-	-	435	-	-	-	-	-	-	-	-	-
C: UNITS: 1940 CENSUS	-	-	365	-	-	772	-	-	720	-	-	-	-	-	-	-	-	-
D: RATIO (%) A3 TO C	-	-	110	-	-	99.4	-	-	25.2	-	-	-	-	-	-	-	-	-
E: SCORES INCOMPLETE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1) Vacant units (Tenure 3)	7	-	7	10	-	10	8	-	8	-	-	-	-	-	-	-	-	-
2) Occupied units (Tenure 0-2)	11	-	11	13	-	13	-	-	-	-	-	-	-	-	-	-	-	-
3) Total	18	-	18	23	-	23	8	-	8	-	-	-	-	-	-	-	-	-
Punch-checked	✓			✓			✓	③		-	-	-	-	-	-	-	-	-

*Breakdown given in item E.

**Rooming units not enumerated in District 3.

Tabular Form DS-6: 1944, Committee on Hygiene of Housing, APHA

FIGURE 22. THREE-CITY COMPARISON: CONTROL TABULATION

GRAPHIC PATTERN OF QUALITY

Figure 21 shows the graphic pattern of quality (Chart 0-B) for the three districts described above. In this case the graphic pattern is used not as a test of quality difference but for summary presentation of conditions in the three districts to be analyzed. For this purpose the median housing, dwelling and facilities scores have been graphed as previously explained. Here, however, values shown are absolute scores, not punching classes, and exact median values have been calculated.

The graph shows district 1 to be definitely worse than the others, with median dwelling and facilities scores about twice those of district 2. Districts 2 and 3 do not meet the rough test, discussed in Part I, for a clearance area (median facilities score of 50 points), but district 1, with median of 94 points for facilities, looks from this first indication like a definite candidate for slum clearance.

Though district 1 shows much worse dwelling condi-

tions than the others, its environment is distinctly better. While the median environment score is not plotted on the graph it can be read approximately, as in Figure 20, by subtracting the dwelling score from the housing score. This indicates a median environmental penalty of approximately 50 points in district 1 as compared with about 70 points in the other two areas. Even this preliminary showing suggests that district 1 might be suitable for rehousing if it were to be cleared, but that rehabilitation of the other districts would perhaps be hampered by more severe deficiencies of environment.

CONTROL TABULATION

Aside from its primary purpose of recording the counts of dwellings for reference in later tables, the control tabulation supplies several kinds of information useful to the director both in supervising his staff and in interpreting the results.

Control tables are not converted into chart form, and

ANALYSIS AND INTERPRETATION

DESCRIPTION OF HOUSING: Structures and Dwelling Units:

SHEET 1 of 1

CHART 2-B

Percent of dwelling structures and dwelling units with stated

STUDY 1944 THREE-CITY COMPARISON

characteristic, by district

Readings Entries DEF Date 11/24/44

District	District 1						District 2						District 3					
Cases in study: Structures/D.U.	304/393						238/757						195/435					
Percent of cases	1	7	33	50	67	83	1	7	33	50	67	83	1	7	33	50	67	83
ITEM	d	c	m	d	c	m	d	c	m	d	c	m	d	c	m	d	c	m
STRUCTURE*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Type: 1-family	-	-	-	-	69	-	2	-	-	-	-	-	11	-	-	-	-	-
2-family	3	-	-	-	-	-	20	-	-	-	-	-	-	-	-	47	-	-
3-family or more (tenement)	-	-	28	-	-	-	-	-	-	78	-	-	-	-	-	42	-	-
Location: alley or rear yard	-	-	28	-	-	-	0	-	-	-	-	-	12	-	-	-	-	-
Constr: wood, 3 stories or more	0	-	-	-	-	-	25	-	-	-	-	-	-	-	44	-	-	-
DWELLING UNIT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tenure:** owner-occupied	0	-	-	-	-	-	19	-	-	-	-	-	8	-	-	-	-	-
Monthly rent:*** under \$20	-	-	39	-	-	-	-	-	53	-	-	-	-	-	43	-	-	-
\$20 - \$29.9	-	-	37	-	-	-	-	-	43	-	-	-	-	37	-	-	-	-
\$30 or more	-	24	-	-	-	-	4	-	-	-	-	-	20	-	-	-	-	-
Size:*** 1 or 2 rooms	-	25	-	-	-	-	2	-	-	-	-	-	9	-	-	-	-	-
3 to 5 rooms	-	-	-	-	63	-	-	-	-	87	-	-	-	-	-	75	-	-
6 rooms or more	-	12	-	-	-	-	11	-	-	-	-	-	16	-	-	-	-	-
Location:**** in basement	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-

*Percentages are of all structures. **Percentage is of all occupied units. ***Percentages are of units reporting rent or size. ****Percentage is of all units.

Tabular Form DS-6: 1944, Committee on Hygiene of Housing, APEA

FIGURE 23. THREE-CITY COMPARISON: DESCRIPTION OF HOUSING

the original work table (1-B) is shown as Figure 22. It gives the counts of dwelling and rooming units and shows the relation of the survey counts to those of the 1940 Housing Census.⁶⁷

The table pictures the relative size of these districts, by reference to items A-3 and C. Districts 1 and 3 each show about 400 dwelling units studied, but in district 1 all units were enumerated while district 3 shows a 25 percent sample of a district with 1,720 dwelling units.

Next the table shows (item A-3) that rooming units were not surveyed in district 3 and that they do not occur to a significant degree in districts 1 and 2. In a typical study the rooming unit punch cards for districts such as 1 and 2 would be segregated and combined with those of other districts for later tabulation—probably of rank A for all rooming units in the survey. This prac-

⁶⁷ Sheets 2 and 3 of this table, omitted here, would give the corresponding counts for structures (taken from the master punch cards) and the counts of blocks and frontages from the environmental survey.

tice is assumed in later charts presented here, which are based on dwelling units only.

Item B shows agreement in all districts between the number of punch cards processed and the number of units recorded in the Dwelling Serial List at the end of data collection. This indicates that no schedules or punch cards were mislaid during the processing phase.

Item D shows substantial agreement in district 2 between the Census count of units and that of the current survey; for district 3 this item indicates that the specified sample of 25 percent was carried out with good accuracy. In district 1 the current survey shows 10 percent more units than reported by the 1940 Census. Unless new construction is known to have occurred, this may suggest that conversion of dwellings into smaller units has been proceeding in this area. If true this may give rise to problems in light housekeeping or other small units where over-sharing of sanitary or kitchen facilities is often prevalent.

AN EXAMPLE OF PRIMARY ANALYSIS

DESCRIPTION OF OCCUPANTS of Dwelling Units:

SHEET 1 of 1

CHART 3-B

Percent of households with stated characteristic, by district

STUDY 1944 THREE-CITY COMPARISON

Readings Entries DEF Date 11/24/44

District	District 1						District 2						District 3					
Households (Occupied D. U.)	386 DU						747 DU						427 DU					
Percent of households	1	7	3	5	0	6	7	8	3	1	7	3	5	0	6	7	8	3
I T E M	d	c	m	d	c	m	d	c	m	d	c	m	d	c	m	d	c	m
RACE: Nonwhite						60					15					0		
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PERSONS IN HOUSEHOLD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1 to 3 persons		23									54					46		
4 to 6 persons				43						41					21			
7 persons or more			34				5								33			
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FAMILIES DOUBLED: Two or more	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
families in household		16					7						4					
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FAMILY INCOME PER MONTH*	No Data						No Data						No Data					
Below \$100	-	-	-	-	-	-	-	15					-	-	-	-	-	-
\$100.0 - \$149.9	-	-	-	-	-	-	-		28				-	-	-	-	-	-
150.0 - 199.9	-	-	-	-	-	-	-		41				-	-	-	-	-	-
200.0 or more	-	-	-	-	-	-	-	16					-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*Percentages are of families reporting income; for percentage not reporting see Table 3-B

Tabular Form DS-6: 1944, Committee on Hygiene of Housing, APHA

FIGURE 24. THREE-CITY COMPARISON: DESCRIPTION OF OCCUPANTS

The breakdown of scores incomplete, item E at the bottom of the table, shows that vacancies run less than 2 percent in all three districts. Vacant units, necessarily unscorable, account for over one-third of all the incompletely scored cases in districts 1 and 2. Since the other incompletely scored units account for less than 3 percent of the total punch cards in both these districts, it is evident that there was no substantial difficulty with information refused or dwellings inaccessible because of chronic family absence. In the sampling study of district 3, units unscorable for refusals or absence of the family could have been replaced from a reserve sample selected for this purpose. The absence of incomplete scores other than for vacancy indicates either that such replacements were made or that no refusals were encountered.

DESCRIPTION OF HOUSING

Figures 23 and 24 show the kinds of dwellings and households comprising these three areas; examination

of these charts may give leads both for interpreting the primary findings on quality and for planning the later secondary analysis.

District 1 shows up in Figure 23 (Chart 2-B) as a neighborhood of single-family houses, while districts 2 and 3 show a majority of two-or-more family structures, with tenements of three or more families strikingly predominant in district 2. Alley or rear yard houses show significant concentration in district 1, and they may need investigation in district 3 as well. Districts 2 and 3 have enough units in wood structures of three or more stories to suggest a study of fire hazards in these usually low grade structures.⁶⁸ Basement units, however, will not require investigation in any of these districts.

In district 1, no home ownership occurs, and rents are relatively high. The percentage of one and two room units is unusually great, suggesting that the previous

⁶⁸ So-called two and one-half story houses are not included in this classification.

ANALYSIS AND INTERPRETATION

DISTRIBUTION OF TOTAL SCORES:

SHEET 1 of 1

CHART 4-B

Percent of scored dwelling units with score in stated range.

STUDY 1944 THREE-CITY COMPARISON

by district

Readings Entries DEF Date 11/24/44

District	District 1									District 2									District 3								
Scored dwelling units	375 DU									734 DU									427 DU								
Percent of units	1	2	3	5	0	6	7	8	3	1	2	3	5	0	6	7	8	3	1	2	3	5	0	6	7	8	3
PENALTY SCORE	d	c	m	d	c	m	d	c	m	d	c	m	d	c	m	d	c	m	d	c	m	d	c	m	d	c	m
ENVIRONMENT TOTAL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
120 points or more	5	-	-	-	-	-	-	-	-	33	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-
60 - 119 points	-	-	-	43	-	-	-	-	-	-	-	-	59	-	-	-	-	-	-	-	-	-	60	-	-	-	-
0 - 59 "	-	-	-	-	52	-	-	-	-	8	-	-	-	-	-	-	-	-	-	-	-	40	-	-	-	-	-
DWELLING TOTAL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
120 points or more	-	-	-	-	-	-	65	-	-	14	-	-	-	-	-	-	-	-	12	-	-	-	-	-	-	-	-
60 - 119 points	-	-	23	-	-	-	-	-	-	-	-	53	-	-	-	-	-	-	-	-	36	-	-	-	-	-	-
0 - 59 "	-	12	-	-	-	-	-	-	-	33	-	-	-	-	-	-	-	-	-	-	-	52	-	-	-	-	-

Tabular Form DS-6: 1944, Committee on Hygiene of Housing, APHA

FIGURE 25. THREE-CITY COMPARISON: DISTRIBUTION OF TOTAL SCORES

interpretation of conversions into light housekeeping suites since 1940 may be correct. The combination of small units and relatively high rents in district 1 will probably warrant analysis through secondary tabulations, to see whether rents are excessive for the quality of housing offered and whether legal requirements are being observed as fully as could be expected from those owners who have good rental revenue.

The tenements of district 2 show generally low rents and a preponderance of units in the medium size range. In this area, which Figure 21 has shown to be substantially better than district 1, the problems of enforcement will presumably be less, but they may be complicated by the low level of rental income to owners.

The most striking characteristic of district 3 is its high concentration of three-story wood buildings, in which analysis of specific fire hazards will certainly be justified. Rents here are about as high as in district 1, but apply to larger and better units.

DESCRIPTION OF OCCUPANTS

Figure 24 (Chart 3-B) suggests definite problems in district 1. A majority of the families are nonwhite, and one-third of the households consist of seven or more persons. One-sixth of the units show doubled families. These factors, together with the small size of units and high rents previously noted, suggest that overcrowding and discriminatory rents for Negro housing may be among the problems to be investigated.

Large households in district 3 may foreshadow overcrowding there as well, but there is no Negro problem and doubling of families is negligible.

In district 2 a small concentration of Negroes may call for analysis of their special problems. General overcrowding is hardly to be expected here, however, in view of the small household sizes and the normal range of unit sizes noted in Figure 23.

Income data are lacking for districts 1 and 3, but in district 2 a median monthly income above \$150 is shown,

AN EXAMPLE OF PRIMARY ANALYSIS

DISTRIBUTION OF BASIC DEFICIENCIES BY NUMBER:

SHEET 1 of 1

CHART 5-B

Percent of scored dwelling units with stated number of

STUDY 1944 THREE-CITY COMPARISON

basic deficiencies, by district

Readings Entries DEF Date 11/28/44

District	District 1						District 2						District 3								
Scored dwelling units	375 DU						734 DU						427 DU								
Percent of units	1	7	3	3	5	0	6	7	8	3	1	7	3	3	5	0	6	7	8	3	
NUMBER OF BASIC DEFICIENCIES	d	c	m	d	c	m	d	c	m	d	c	m	d	c	m	d	c	m	d	c	m
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9 Basic Deficiencies or more	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8 Basic Deficiencies	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7 " "	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6 " "	12	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5 " "	19	-	-	-	-	-	3	-	-	-	0	-	-	-	-	-	-	-	-	-	-
4 " "	13	-	-	-	-	-	5	-	-	-	-	-	13	-	-	-	-	-	-	-	-
3 " "	24	-	-	-	-	-	11	-	-	-	-	-	15	-	-	-	-	-	-	-	-
2 " "	9	-	-	-	-	-	19	-	-	-	-	-	28	-	-	-	-	-	-	-	-
1 " "	7	-	-	-	-	-	32	-	-	-	-	-	13	-	-	-	-	-	-	-	-
0 " "	0	-	-	-	-	-	30	-	-	-	-	-	31	-	-	-	-	-	-	-	-
Median Number Basic Deficiencies	Four	-	-	-	-	-	One	-	-	-	-	-	Two	-	-	-	-	-	-	-	-

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FIGURE 26. THREE-CITY COMPARISON: DISTRIBUTION OF BASIC DEFICIENCIES BY NUMBER

reflecting full employment in a war-goods city, with many families temporarily having two or more wage earners. These income figures are probably a false guide to rent-paying ability in the post-war period.

MEASURES OF QUALITY

Total scores. Figure 25 (Chart 4-B) indicates the relative importance of environmental and dwelling deficiencies. Total housing scores could also be plotted on this chart from Table 4, but a clear picture is given by dwelling and environmental scores alone.

Figure 21 showed that environmental scores are best in district 1 where dwelling conditions are poorest, but the present chart gives a fuller picture of these relationships. In district 1 over half of the units have an environment which would fall in grade B or better with the standard range of 30 points for each quality grade, and only 5 percent would fall in grade E. District 3 shows a majority of units in grade D or C environment, but

none in grade E, whereas one-third of those in district 2 fall in this poorest classification. Pending study of specific environmental deficiencies, these summary results strengthen the expectation that rehousing might successfully be carried out in district 1, while serious obstacles to rehabilitation may be expected in at least the poorest third of district 2.

Whereas the chart does not show the exact nature of either dwelling or environmental deficiencies, it establishes the extremely poor general character of dwellings in district 1. Almost two-thirds of the units have Dwelling Total Scores of 120 points or more, and about the same proportion of the district's area can be expected to fall in grade E for dwelling quality. Only about one-eighth of dwelling units in districts 2 and 3 fall in this poorest part of the range. About half the units in district 2 and a third in district 3 show scores from 60 to 119 points — characteristic of grades C and D in which extensive blight and wide-

ANALYSIS AND INTERPRETATION

DISTRIBUTION OF SUBTOTAL DWELLING SCORES:

SHEET 1 of 1

CHART 6-B

Percent of scored dwelling units with score in stated range.

STUDY 1944 THREE-CITY COMPARISON

by district

Readings Entries DEF Date 11/28/44

District	District 1 375 DU						District 2 734 DU						District 3 427 DU					
Scored dwelling units	17	33	50	67	83		17	33	50	67	83		17	33	50	67	83	
Percent of units	d	c	m	d	c	m	d	c	m	d	c	m	d	c	m	d	c	m
PENALTY SCORE																		
FACILITIES SUBTOTAL																		
60 points or more						85										19		
30 - 59 points		15								44				21				
0 - 29 "	0								26							60		
MAINTENANCE SUBTOTAL																		
30 points or more						43				34				8				
0 - 29 points						57				66								92
OCCUPANCY SUBTOTAL																		
30 points or more						53			9							35		
0 - 29 points						47							91			65		

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FIGURE 27. THREE-CITY COMPARISON: DISTRIBUTION OF SUBTOTAL DWELLING SCORES

spread problems of law enforcement can be expected.

Basic deficiencies. Figure 26 (Chart 5-B) gives the distribution of basic deficiencies, or prevalence of major substandard dwelling conditions. Previous charts have shown bad conditions in district 1, but here it becomes evident how phenomenally bad they are. No unit is free from basic deficiencies; 47 percent have five or more, and one-sixth have seven or eight basic deficiencies apiece! Worse housing can perhaps be found in some American cities, but it is doubtful.

District 2, with 70 percent of its units substandard (30 percent having no basic deficiency), will compare roughly with the grade D appraisal areas of the New Haven study. Only 8 percent of the units have as many as four basic deficiencies, and the heart of the problem here is obviously the 38 percent of units with two or more basic deficiencies apiece. Presumably a considerable proportion of the 32 percent with only one basic

deficiency could be brought up to a fair contemporary standard by measures short of legal action or removal of the families. A corrective program for a district such as this would be addressed to conditions which might go almost unnoticed in the first attack on district 1.

District 3, which was shown by Figure 25 to have smaller dwelling penalties than district 2, has nevertheless a greater concentration of substandardness, with 56 percent of units showing two or more basic deficiencies as compared with 38 percent for district 2. The reason for this anomaly should be found; perhaps it will lie in severe overcrowding, for district 3 like district 1 has a high percentage of large households.

Dwelling subtotal scores. The concentration of occupancy problems anticipated for districts 1 and 3 is shown in Figure 27 (Chart 6-B). Penalty scores of 30 points or over in the occupancy group cannot be incurred except where overcrowding is extreme; a majority

AN EXAMPLE OF PRIMARY ANALYSIS

DISTRIBUTION OF DWELLING DEFICIENCIES BY TYPE: Basic Deficiencies:

SHEET 1 of 4

CHART 8-B

Percent of scored dwelling units with stated basic deficiency,

STUDY 1944 THREE-CITY COMPARISON

by district

Readings Entries DEF Date 11/28/44

District	District 1						District 2						District 3					
Scored Dwelling Units	375 DU						734 DU						427 DU					
Percent of units	17	33	50	67	83		17	33	50	67	83		17	33	50	67	83	
ITEM	d	c	m	d	c	m	d	c	m	d	c	m	d	c	m	d	c	m
FACILITIES																		
Toilet: shared or outside struc.	-	-	-	-	-	69	-	-	13	-	-	-	-	-	16	-	-	-
Bath: none on premises	-	-	-	-	-	72	-	-	26	-	-	-	-	-	21	-	-	-
Water: outside DU or structure	-	-	-	-	-	48	-	-	0	-	-	-	-	-	0	-	-	-
Dual Egress: lacking for unit	-	-	23	-	-	-	-	-	6	-	-	-	-	-	4	-	-	-
Inst. Heater: lacking, 3/4 rms.	-	-	4	-	-	-	-	-	31	-	-	-	-	-	5	-	-	-
Electricity: none installed	-	-	-	-	-	51	-	-	2	-	-	-	-	-	0	-	-	-
MAINTENANCE																		
Deterioration: * class 2 or 3	-	-	-	-	-	53	-	-	36	-	-	-	-	-	35	-	-	-
OCCUPANCY																		
Persons per Room: over 1.5	-	-	-	-	-	44	-	-	7	-	-	-	-	-	28	-	-	-
Persons per Sleeping Room: **	-	-	-	-	-	37	-	-	10	-	-	-	-	-	21	-	-	-
Sleepg Area/Person: less than 40 sq. feet	-	-	-	-	-	28	-	-	5	-	-	-	-	-	7	-	-	-

*Penalty score of 15 points or more. **Total number of persons equals or exceeds (2 x number of sleeping rooms plus 2).

Tabular Form DS-6: 1944, Committee on Hygiene of Housing, APHA

FIGURE 28. THREE-CITY COMPARISON: DISTRIBUTION OF BASIC DEFICIENCIES BY TYPE

of units in district 1 and over one-third of those in district 3 show scores of this order. In district 2 such overcrowding is a minor problem, as was anticipated from the earlier charts.

Facilities scores further refine the previous indications of extremely bad conditions of district 1. Eighty-five percent of the units have scores at least ten points in excess of the 50 points which have been cited as a rough measure of dwellings which usually cannot be rehabilitated.

Maintenance scores of 30 points and over can be taken as an index of deficiencies in upkeep which may warrant official intervention. Over 40 percent and 30 percent of dwellings in districts 1 and 2, respectively, show the scores in this range, indicating that health and building departments will have a considerable problem of law enforcement on sanitation and repairs. Markedly smaller maintenance penalties in district 3 are due in part to

the fact that some of the schedule items on maintenance had not been developed at the time that district was studied. No significance can therefore be attached to the maintenance findings there.

TYPES OF DEFICIENCY

To graph the salient findings of dwelling and environment deficiency Tables 8 and 9, even in condensed form, will usually require two sheets apiece for Charts 8 and 9. Only one sheet of these results is presented here. Figure 28 (Chart 8-B) gives the distribution of the ten basic deficiencies which occur to a significant degree in these three districts.

An extreme problem of overcrowding abatement is indicated in district 1, where all three basic deficiencies for occupancy show incidence of 28 to 44 percent. Less but still serious overcrowding is evident in district 3, where more than a quarter of the units show over one

ANALYSIS AND INTERPRETATION

and one-half persons per room.⁶⁹ Conditions in district 3 appear to be somewhat relieved by room sizes larger than in the other districts: while 21 percent of the units show an excessive number of persons per sleeping room, only 7 percent show sleeping area of less than 40 square feet per person.⁷⁰

As to facilities, district 1 seems hopeless for rehabilitation, even without considering the nonbasic deficiencies—which would add many counts to the indictment. Who will contend that dwellings can be brought up to a modern standard on any economic basis when 72 percent of them have no bath on the premises, 69 percent have shared or outside toilets, 51 percent have no electricity, and 48 percent have no water inside the unit? A major safety hazard appears for the district in the 23 percent of units lacking dual egress. This condition, resulting from many small second floor units with a single stair and no fire escape, is one which can cause the death of occupants. If these dwellings are to remain in use this defect should be remedied at once, regardless of what is done about the others.

These deficiencies of district 1 take on added significance when it is recalled that rents there are considerably higher than in the other districts, with about one-quarter of the units renting for \$30 or more per month. It would seem fair to judge that landlords are widely profiteering on these predominantly Negro families, and that correction of basic defects should be ordered (where these are structurally possible) in buildings not marked for early demolition.

In districts 2 and 3 defects of sanitary facilities and hazardous egress are much less widespread, though 26 and 21 percent of units are without bath and 13 and 16 percent have shared or outside toilets. In district 2, 31 percent of units show heating facilities grossly inadequate for a northern climate, and such a condition should be a matter of concern for the health or building department, whichever has jurisdiction over provisions for heating.

In all three districts, a third to half the units show a degree of disrepair which would indicate that correction orders by the building, health or fire departments are needed.

6. An Example of Secondary Analysis

Secondary analysis by types of housing can be demonstrated with descriptive Chart 2-B of the primary analysis (Figure 23, above) as a starting point. General interpretations will be made of districts 1 and 2 (omitting district 3), and a complete plan of tabulation in Secondary Series 1 will be derived for them. Secondary

⁶⁹ This means, for instance, seven persons, not six, in a four-room unit; or at least ten persons in six rooms.

⁷⁰ A second sheet of this chart, giving nonbasic deficiencies, would show, however, another 20 percent of units with only 40-49 square feet per person.

analysis in Series 2, by characteristics of occupants, will be omitted from this demonstration. Such analysis would use a similar approach from Chart 3-B.

SECONDARY TEST OF QUALITY DIFFERENCE

Chart 2-B (Figure 23) gives characteristics for which quality difference should be tested. Both districts 1 and 2 have a significant concentration of tenement (multi-family) structures, and the quality of these should be compared with that of nontenements. District 1 shows over a fourth of its dwelling units in alley or rear yard locations, and these should be compared with dwellings having a normal relation to the street. In district 2, almost a fourth of the units are located in wood structures of three stories or more—a type in which specific fire hazards and deterioration may warrant special analysis. In both districts a test for quality in low and higher rent dwellings should be made.

The factor selected for test is Dwelling Total Score—the broadest measure of dwelling quality. Other factors might also be chosen, depending on the purpose of the study or on findings of primary analysis. For instance, if the study were specifically directed to a program of slum clearance, with broader purposes subordinated, the test might be made in terms of facilities scores alone. Or if the primary analysis had shown that overcrowding was the problem of greatest general concern, occupancy scores might be featured in secondary tests of quality difference.

In the present case the test is made for both districts by tabulating Dwelling Total Scores (with range-graph) for dwelling units in the descriptive groupings indicated above: tenement and nontenement units, and units renting below and above \$20 per month. For district 1 rear structures are tested against those on the street; and for district 2 units in wood structures of three stories and over are compared with units in all other structures.

RESULTS AND INTERPRETATION: DISTRICT 1

Results are given (in terms of the range graphs only) in Figure 29.⁷¹ Rear dwellings of district 1 are so much worse than others that further analysis is not necessary to show these as the heart of the problem in this generally very poor district. A tabulation of the number of basic deficiencies for rear and street structures might be useful, however, to clinch the case for demolition of these poorest dwellings (Table 15-B); or a showing of selected deficiencies in rear structures alone might be sufficient (Table 18-B).

⁷¹ In practice, the full tabulation of scale readings and percentage distributions is made in columns c and d of the Tabular Form. These give the basis for the range graphs, which are then transcribed onto separate sheets without the tabular data, to permit several comparisons on a single sheet. The tabulations of this test become a part of the full secondary tables under the appropriate subject of analysis. Tabulations underlying the present chart, for instance, would become part of Table 14-B.

AN EXAMPLE OF SECONDARY ANALYSIS

SECONDARY TEST OF QUALITY DIFFERENCE: by Type of Housing:

SHEET 1 of 1

CHART 10-B

Dwelling score; class of median and range of middle 50% of cases,

STUDY 1944 THREE-CITY COMPARISON

dwelling units with scores complete, districts 1 and 2

Readings Entries DEF Date 11/29/44

Gen'l Descriptive Classification District	Struc Location District 1			Type of District 1			Structure District 2			Monthly Rent District 1			of Unit District 2			Construction* District 2		
Descriptive breakdown/% of units	Rear 28%	On Strt 72%			Tenmt 28%	Other 72%	Tenmt 78%	Other 22%			to \$20 39%	\$20+ 61%	to \$20 53%	\$20+ 47%		3+w 23%	Other 77%	
CLASS OF DWELLING SCORE	d	c	m	d	c	m	d	c	m	d	c	m	d	c	m	d	c	m
Class 15: 280 points or more	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" 14: 260 - 279 points	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" 13: 240 - 259 "	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" 12: 220 - 239 "	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" 11: 200 - 219 "	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" 10: 180 - 199 "	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" 9: 160 - 179 "	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" 8: 140 - 159 "	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" 7: 120 - 139 "	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" 6: 100 - 119 "	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" 5: 80 - 99 "	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" 4: 60 - 79 "	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" 3: 40 - 59 "	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" 2: 20 - 39 "	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" 1: 1 - 19 "	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
" 0: 0 "	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*Breakdown is: units in wood exterior structures of 3 or more stories; units in other structures

Tabular Form DS-6: 1944, Committee on Hygiene of Housing, AFHA

FIGURE 29. THREE-CITY COMPARISON: SECONDARY TEST OF QUALITY DIFFERENCE

District 1 shows the condition, unusual in this region, of nontenements worse than tenements, due to a concentration of the lowest type of one- and two-family dwellings on alleys and interior courts. Secondary analysis of conditions in these types of dwellings will clearly be needed. If the prevalence of basic deficiencies is desired as a general measure, Table 15-B will supply the picture. If the relative seriousness of facilities, maintenance and occupancy defects will supply a guide to policy of the sponsors, Table 16-B should be specified. If the purpose is to discover and correct particular deficiencies within the jurisdiction of sponsoring agencies, a selected list of appraisal items can be analyzed through Table 18-B.

In both districts, low rent dwellings show the customary excess of penalty scores over higher rent dwellings, though it is worthy of note that in district 1 the penalty scores are nearly twice as high in both rent brackets as in district 2. In both places it may be useful

to tabulate the degree of substandardness (number of basic deficiencies) by class of rent (Table 15-B), even though Chart 5-B (Figure 26) has shown that all units in district 1 are substandard. Tabulations of Dwelling and Environment Total Scores (Table 14-B) by class of rent would indicate the relative importance of dwelling and environmental defects in various parts of the rent range, and Table 16-B, giving a distribution of the subtotal dwelling scores, would indicate the relative importance of facilities, maintenance and occupancy defects by class of rent. Analysis of selected dwelling deficiencies (Table 18-B) by class of rent would offer a guide to enforcement based on economic ability of the landlord.

SUGGESTED PLAN OF SECONDARY TABULATION FOR DISTRICT 1

In summary then, a rather wide body of information for policy-making purposes would be obtained, and

ANALYSIS AND INTERPRETATION

with moderate outlay of tabulation time, by making all or part of the following tables and their corresponding charts:

Table 14-B: Distribution of Total Scores (Housing, Dwelling, Environment) Tabulated by Units by Class of Rent

Table 15-B: Number of Basic Deficiencies Tabulated by Units in Tenement and Nontenement Structures

" " Number of Basic Deficiencies Tabulated by Units in Rear and Street Structures

" " Number of Basic Deficiencies Tabulated by Units by Class of Rent

Table 16-B: Distribution of Dwelling Subtotal Scores (Facilities, Maintenance, Occupancy) Tabulated by Units in Tenement and Nontenement Structures

" " Distribution of Dwelling Subtotal Scores (Facilities, Maintenance, Occupancy) Tabulated by Units by Class of Rent

Table 18-B: Specific Dwelling Deficiencies⁷² Tabulated by Units in Tenement and Nontenement Structures

" " Specific Dwelling Deficiencies Tabulated by Units in Rear and Street Structures

" " Specific Dwelling Deficiencies Tabulated by Units by Class of Rent

With marginal punch cards, one clerk could sort the cards and make all the secondary tables listed above in six or seven days for 1,000 dwelling units, assuming that about 10 of the 30 deficiencies were selected for Table 18-B.

⁷² Table 18-B could well be a partial tabulation, covering only those deficiencies in which the sponsors have particular interest—perhaps the deficiencies which they have legal powers to correct.

RESULTS AND TABULATION PLAN FOR DISTRICT 2

Quality of tenements and nontenements in district 2 has a reverse pattern from that of district 1. Tenement and nontenement conditions will, however, need analysis in the same fashion as adopted for district 1. The same is true of conditions by class of rent, with the added factor that in district 2 owner-occupied dwellings, which do not occur in the other area, would be tabulated.

The test of difference shows substantially identical overall quality in three-story wood and other structures in district 2. Clearly no broad analysis based on this distinction is worth while.

A plan of secondary analysis for district 2 would parallel that of district 1 except that tabulations by rear and street structures would be omitted. A limited tabulation for three-story wood structures alone, covering selected deficiencies related to fire hazards, might be justified: means of egress, dark halls, and daylight obstruction (which gives an indirect measure of conflagration hazard among wood buildings), since these characteristics may contribute to the slightly higher penalty scores shown for this type of structure. Such a tabulation would be specified as part of Table 18-B.

INTERPRETATION OF SECONDARY TABLES

The range graphs and other chart materials from tabulations such as those outlined above will ordinarily reveal many conditions and relationships from which the sponsors' program can be shaped, and concerning some of which immediate action will be indicated. A few such interpretations are sketched in Chapter III of Part I, and others are suggested in Chapter VI of this manual. Practice in such interpretation can be gained with the consultant by constructing secondary tables and charts from his demonstration punch cards.

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Chapter VI

PUTTING THE RESULTS TO WORK

A written report will usually be required to present the findings to sponsoring agencies and perhaps for general publication. Such a report is not the ultimate goal of a study but merely a means to the end of securing the remedies needed. Since the character and scale of a report will be largely determined by the objectives of a particular study and by the composition of the sponsoring group, no set pattern for it will be offered here. The present chapter, however, points out certain mechanics of reporting which the Committee has found helpful, and it highlights broader questions to be considered both in writing a report and in following it up with programs of action.

1. Organization of a Report

GENERAL CRITERIA

A basic test of any report is whether it is addressed to a clear purpose in terms of the policies and programs to be affected. It should be written with a definite group of readers in mind, whether these be the principals of the sponsoring agencies, some other special group or the general public. Text should be simple and free from technical jargon. The organization should provide clear chapters or other subdivisions, reflected in a table of contents from which the reader can readily find his way into any part of the report which particularly interests him. Charts, maps and photographs should be used to the extent that will speed telling the story, but they do not take the place of thoughtful text.

The director who does not have experience in writing reports may find that a few dollars spent on editorial criticism or on typographic advice will be an excellent investment, making the difference between an ineffective report and one that commands attention.

SUMMARY OF FINDINGS; EXPLANATION OF APPRAISAL METHOD

A summary of findings and recommendations at the beginning of a report is usually desirable. This should be as short as possible, giving only the end results, not the full reasoning behind them. The reader who believes the job a good one may accept the findings without go-

ing farther; he who challenges the study can find his answers in the fuller text that follows.

A chapter explaining the appraisal method may be advisable, since the concept of scoring and the method of doing so will be unfamiliar to most readers. Explanatory materials given in Part I or in the early chapters of Parts II and III may of course be quoted or paraphrased for this purpose.

SEQUENCE OF PRESENTATION

Presentation of the detailed findings might follow the sequence used for the New Haven survey in Part I, where results of the primary analysis were set forth to give the extent and location of the problem before considering remedial programs, but special interests of sponsoring groups may warrant a different arrangement. It is a matter of choice whether the primary findings be presented as in Part I, with dwelling and environmental results preceding those for total housing quality, or whether these should be reversed with the broad results for housing quality presented first. The latter scheme is recommended, since it summarizes the results of the entire study in one map and related tables.⁷³ These broad results can then be broken down into their component scores as appropriate for the scale of the report.

MAPS

A small number of maps will usually suffice if tables and charts (a less expensive form of presentation) are organized to tell their share of the story. In several reports it has been found sufficient to give only four or five maps: one each for housing, dwelling and environmental quality, with a supplementary map or two on slum clearance areas or on some other problem of special local interest. Additional maps might be justified in an ambitious report, showing distribution of subtotal scores for facilities, maintenance and occupancy, and all or part of the corresponding subtotal scores of the environmental survey. Maps of descriptive

⁷³ In Part I, dwelling results were presented first because dwelling quality grades were determined from basic deficiencies rather than penalty scores, and called for separate explanation of this special practice.

PUTTING THE RESULTS TO WORK

characteristics, such as distribution of racial groups or of the various types of dwellings, may be useful. Refined maps of this sort could be carried in an appendix unless they are considered essential to an understanding of the main text. An appendix is also ordinarily the place for elaborate tables, facsimiles of schedules, details of the rating scale, and similar materials of interest only to the critical reader.

Presentation maps should ordinarily be prepared with a black and white indication rather than in color, as colored maps are difficult and costly to reproduce. Good black and white rendering of a five-part classification, which is about as many as the eye can readily take in, can be obtained by a well-studied scheme of cross-hatching, as illustrated in the map legends of Part I.⁷⁴

Maps should carry a north point or compass rose and a graphic scale. It is also desirable to show all wholly nonresidential blocks (parks, industry or business and institutions) by special indication. These features are illustrated in the maps of Part I.

It is good practice to make all maps, even of the earliest sketch variety, in black and white indication, so they can be photostatted.

Titles of presentation maps, tables and charts should be studied for simplicity, and the practice used in Part I may offer helpful suggestions.

TABLES AND CHARTS

Tables prepared on the standard Tabular Form are of course intended for working reference of the survey staff, and are too complex for presentation in a non-technical report. Presentation tables can usually be made by transcribing the column d values (and perhaps by combining stub classes) of work tables. Those inexperienced in making tables will find help in Ray Ovid Hall's sound and highly readable "Handbook of Tabular Presentation."⁷⁵ It gives many practical hints for table layout and an excellent checklist of points to be watched for clarity of tabular materials.

Charts on the Tabular Form may be used for presentation in a report, though a draftsman can make final graphs in more attractive form if cost is not an obstacle.

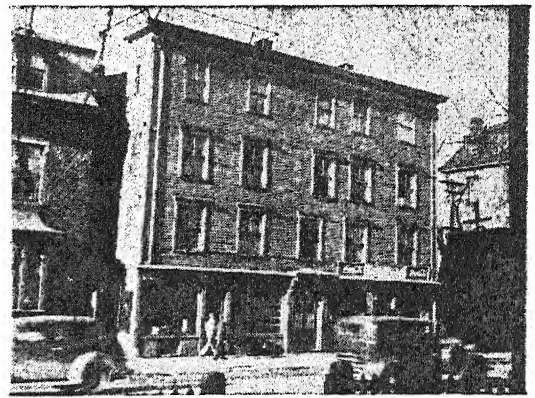
PHOTOGRAPHS

Pictures are most effective in a report on this type of appraisal, for they will show what conditions—interior as well as exterior—occur in any quality grade or in any part of the scoring range. Dwellings or blocks which will photograph well can be selected from the classes of punch cards containing the median or quartile values for the type of rating to be illustrated.

⁷⁴ Schemes of hatching, dotted patterns, etc., commercially available in gummed transparent sheets may or may not save drafting time, but their patterns seldom give a clear graphic build-up of weights from class to class. Manual rendering of the scheme used in Part I is urged.

⁷⁵ Ronald Press Company, New York, 1943.

AMONG THE POOREST HOUSES IN BAYSIDE



A dwelling unit on the fourth floor incurs a penalty score of 108 points for facilities.

This five-room unit offers its occupants:

- inadequate means of egress from a firetrap structure toilet outside the dwelling unit and shared by two units
- no bath on premises
- no piped hot water
- no laundry tub or wash basin
- two rooms of substandard area
- three rooms without installed heat
- two rooms without closets
- excessive stair-climb from street

The environmental penalty score for the block containing this structure is 75 points, reflecting:

- overcrowding of the land by buildings
- general intermixture of residence and business uses
- location on heavy traffic street with inadequate off-street play space
- excessive distance and traffic hazard involved in reaching elementary schools, playgrounds and parks.

FIGURE 30. AN ILLUSTRATION OF THE MEANING OF SCORES⁷⁶

Photographs of dwellings can be shown with their appraisal forms or with notes explaining penalty scores in terms of the chief deficiencies. An example is given in Figure 30.

REPRODUCTION

The method of printing a report may have an important effect on the amount of graphic material than can be used. Conventional methods of printing from type call for photo-engravings of all illustrations, often at a greater cost per page than for text. Photo-offset methods, however, permit the use of line maps and charts without special engraving and at the same cost as text. Even with offsetting, photographs, wash drawings or other halftone material will cost more per page than text.

⁷⁶ Adapted from "Does Bayside Need Rebuilding?," report of the Committee to the Portland, Maine, City Planning Board and Health Department, March, 1944.

QUESTIONS OF BROAD POLICY

2. Questions of Broad Policy

Suggested below are basic considerations which may help in determining both the content of a report and the emphasis in follow-up programs of sponsor agencies.

POLICIES BASED ON CLASSIFICATION OF AREAS

Designation of possible clearance areas—illustrated in Figure 7 of Part I—should not be left simply as a recommendation in a report. Effort should be made to have such classifications recognized as the basis of official policy. Where a logical sequence of clearance (and desirable re-use) of the worst slum areas can be agreed upon by enforcement and planning agencies, and the decisions thus reached can be ratified by some formal action, a notable clarification of various official programs should result.

If it can be similarly agreed that other areas do not warrant demolition but call for special enforcement of legal standards, inspection programs will gain effectiveness. Above this level, some neighborhoods might be designated as warranting periodic resurveys to determine whether a downward trend is evident.

NEEDS OF POPULATION GROUPS

Interpretation of the rehousing need should focus attention on the problems of low income groups (if income has not been surveyed, rent levels may sometimes be taken as an indication of income status). Special housing problems of Negroes or other minority race groups should be set forth. Conditions of crowding among large families (and perhaps the problems of those who live in small light housekeeping units) may suggest the need, in a rehousing program, for special attention to large or small dwelling units as a matter of policy and as a problem of design.

REVISION OF OFFICIAL HOUSING STANDARDS

Few cities possess ordinances or other legal instruments which cover the basic requirements of decent housing in clear or reasonably comprehensive fashion. A most useful result of a study might be to point out the need for general revision of regulations to deal with the problems which the survey has shown to be widespread. Occupancy regulations based on the outmoded concept of cubic space will call for revision to the more realistic basis of floor area, and perhaps the legal myth that children require only half as much space as adults might be exploded in this process. If present regulations deal primarily with tenements and impose few requirements on existing one- and two-family structures, findings might be analyzed to show whether the base of regulation should be broadened to include these smaller dwellings. Inadequate regulations for rooming houses may also need revision.

Aside from plugging specific gaps in existing regula-

tions, consideration might be given to broad standards for various kinds of official action. Agreement might be sought as to conditions which would justify demolition of individual structures. A higher standard might be required for continued occupancy of any dwelling, with definite minimum requirements as to facilities, maintenance and space in relation to family size. Relief agencies might subscribe to a minimum standard below which they would refuse to pay their full scale of rent assistance, and eligibility for admission to publicly assisted housing projects could be related to these other official standards.

Attempts might also be made to secure adoption of a policy that properties below a certain standard which revert to the city for tax delinquency would be demolished or otherwise taken off the market.⁷⁷

Basic deficiencies as specified in Chapter II provide exact statements of substandard conditions, and these could be taken as a starting point in framing standards for official purposes. An emergency or other low standard should disregard some of the basic deficiencies, but one intended to be adequate might require that houses be free from all the basic deficiencies and perhaps also from certain other dwelling or environmental defects.

ORGANIZATION FOR ENFORCEMENT

A practical result of the study may be to demonstrate the need for more effective inspection and enforcement. An interdepartmental board for review of enforcement action—used with good effect in several cities—might be considered. Analysis may show that manpower available among the several inspection agencies would suffice to cover the critical areas if energies were better directed and waste motion or overlapping efforts eliminated. Results which show that poor conditions exist beyond the problem areas generally recognized (or in types of dwellings not covered by existing regulations) might be used to support requests for enlarged inspection staffs.

3. Specific Programs

REHOUSING; TREATMENT OF CLEARANCE AREAS

In most studies a major emphasis will be the problem of rehousing in areas to be cleared: what are the amounts of housing needed, what types of families should be accommodated, what is the desirable cost range for new housing, and who can provide such facilities? For clearance areas, consideration may also be needed in regard to interim enforcement policies pending demolition. Presumably no effort would be made to bring these dwellings up to a generally satisfactory standard, but stop-gap enforcement may be desirable concerning such matters as safe means of egress and basic sanitary haz-

⁷⁷ Tax officials have suggested in one city that assessed values of all dwellings in low grade areas should be critically reviewed in the light of quality findings of this appraisal method.

PUTTING THE RESULTS TO WORK

ards. In some cities the question has been raised whether a regulation should be adopted to prevent new dwelling construction or general improvements in such areas, prior to demolition.

LAW ENFORCEMENT MEASURES

Attention should be focussed on problems of enforcement in substandard areas where clearance is not justified. Legal violations in such areas should be followed up, and vacation or demolition of the worst individual dwellings considered. Limited replanning measures for these neighborhoods would be another proper consideration of a detailed report.

Often the appraisal data will indicate the nature of specific enforcement drives needed, such as intensive fire department inspection of buildings which show defective egress, health department campaigns against defective toilets or rat infestation, correction by the building department of dark public halls, abatement of hazards arising from mixed dwelling and nonresidential uses, or immediate vacation of the poorest basement and alley dwellings. Where overcrowding of dwellings is general, abatement will be a special concern of the health department, though new housing may be required.

In some cities useful results have been achieved by drives aimed at educating tenants or owners as to improvements possible through simple types of repair and inexpensive clean-up measures.

CONSERVATION

If the study reveals considerable areas of mediocre but not substandard housing, emphasis may be put on possibilities of modernization and neighborhood improvement at the hands of property owners acting in their own self-interest. If real estate groups are not included among the sponsors of the study, their support of the findings could perhaps be enlisted by analysis directed to this problem. Sketch studies by the city planning commission staff might indicate the possibility of developing local playgrounds or other community open spaces, re-routing unnecessary traffic, or other measures which would improve the condition of such areas at relatively low cost.

4. Release of Findings to the Public

Whether or not a report is produced for general circulation, much can be done to develop public support for the program developed as a result of the appraisal. Often at least one newspaper will assign a reporter to study the data and prepare feature articles and photographs of conditions found. A condensed version of the full report might be specially circulated to all city department heads, members of the city council or board of aldermen, educators, clergymen and other civic leaders. In some cities, movies have been found effective, though

these are usually not desirable unless someone with considerable skill is available to make and edit them.

Local organizations such as men's service or luncheon clubs, labor unions, church groups and women's clubs will welcome good brief talks on the results, perhaps with lantern slides or large copies of maps and charts.

Public school teachers or the faculty of a local university may be interested in the results for teaching purposes. In some cities even the children in elementary schools have carried out simple studies of housing conditions in their own neighborhoods, with suggestions such as might be supplied by the survey director.

These or similar devices for spreading awareness of the local housing problem should be brought to the attention of the sponsors in a general report. A corrective program will take money and meet resistance; it can have no better assurance of success than an educated public opinion.

5. Special Uses of the Data

Where the survey is based on complete enumeration rather than sampling, the punch cards or appraisal forms can be used for a variety of case studies after serving broader purposes of the original appraisal. Management staffs of several housing authorities have indicated a desire for the data on individual dwellings, for use in reviewing the eligibility of families who apply for admission to housing projects. Rent allowances for recipients of relief or old age assistance might be based on the appraisal findings for the dwellings concerned. Social work agencies might be influenced in judging the housing needs of client families which include victims of tuberculosis, rheumatic fever or cardiac impairment.

The mere fact that data exist in convenient form to serve the purposes of numerous agencies could give rise to new types of broad studies with real practical value. It is not inconceivable, to take only one instance, that punch card data on family composition in slum areas might be studied jointly by architects and sociologists to further the design of homes best suited to the sizes and age- and sex-composition of families to be rehoused.

In view of such possibilities for secondary use of the data, it may be worth while to make the punch cards and other materials of the study available in some central place. Preservation of these data in the office of a sponsoring agency would perhaps be sufficient, but where broad interest exists in housing problems a separate central registry may be needed to avoid distraction or unreasonable burdens for the staff of any one sponsor. Punch cards should not be made available without proper safeguards on their use. Safeguards should cover not only policy but mechanics, and some clerk familiar with handling the cards should be designated to make tabulations for special purposes after the original study.

ACKNOWLEDGMENTS

Direct stimulus to develop these procedures came from the Health Department of Memphis, Tennessee. Surveys conducted in that city between 1933 and 1938, using a system of scores and designed as the basis for the Department's housing policy, convinced the Committee on the Hygiene of Housing that such means for measurement of housing conditions were needed for general application. Both men responsible for the Memphis studies, Dr. L. M. Graves, Health Officer, and Alfred H. Fletcher, Sanitary Engineer, serving as members of the Committee and its Subcommittee on Appraisal of Residential Areas, have helped to shape this method for wider use.

Exploratory studies of the Committee, leading to creation of the present subcommittee, were made from 1939 to 1941 by a Subcommittee on Housing Survey Procedures, under the chairmanship of Dr. George C. Ruhland, Health Officer of the District of Columbia. Membership of that group included, in addition to members of the later subcommittee, Claude F. Browning, J. M. DallaValle and Paul F. Krueger.

Health departments, housing authorities, and city planning commissions in several cities have contributed a prime essential to the finished product: the opportunity to try out tentative procedures and find their weaknesses by actual test.

Foremost among cosponsors of such developmental studies are the official agencies of New Haven, Connecticut. B. M. Pettit, Executive Director of the Housing Authority, and Dr. Joseph I. Linde, Health Officer, have worked with the Committee in three surveys dating back to 1939, which have provided the major testing ground. To these men, to their commissioners, and to the staffs they supplied for anonymous legwork a primary debt is owed: first for imagination to see the possibilities of this technique, and second for charity concerning its limitations in the formative stages. Equally consistent and valuable cooperation of the New Haven City Planning Commission, addressed to development of the environmental survey procedures, is acknowledged in Part III.

Early studies in Stamford, Waterbury, and Hartford, Connecticut have contributed much to content of the

schedules and betterment of operating practice. Conducted chiefly for testing purposes of the Committee rather than to supply results of local value, these studies were made possible by cooperation of the Health Officers of these cities: Dr. Paul H. Brown, Dr. Edward J. Godfrey, and Dr. Alfred L. Burgdorf, respectively. Of their staffs, Kenneth E. Alling, Thomas Murphy and Franklin Fiske were particularly helpful.

F. Stuart Chapin, Jr., as a student of the Massachusetts Institute of Technology's School of Architecture and Planning, conducted a similar test study in Somerville, Massachusetts.

The early Connecticut studies were arranged with cosponsorship of the Connecticut State Health Department. Warren J. Scott, Director of Sanitary Engineering, and Eugene L. Lehr, Housing Engineer, of that department have contributed both by helping to arrange the tests and through technical criticism of the procedures.

In Portland, Maine, the City Planning Board, Arthur C. Comey, its planning consultant, and Dr. Travis P. Burroughs, Health Officer, sponsored the first official survey outside Connecticut, strengthening the pattern of interdepartmental cooperation established in New Haven. H. Norton Maxfield, Planning Engineer of the Board, was the first local director of a survey made with consulting service from the Committee.

Two surveys in progress at the time of writing have contributed substantially to final development of the technique.

A current official study in Los Angeles, California, initiated by the City Health Department through Dr. George M. Uhl, Health Officer, and Charles L. Senn, Director of Sanitation, has been cosponsored by the City Housing Authority and Howard L. Holtzendorff, its Executive Director. Opportunity offered by this study to observe the method at work across the continent from its point of origin has been invaluable in final editing of various materials. In Los Angeles also there have been wholehearted cooperation and technical contributions by the City Planning Commission, acknowledged in Part III.

The Washington Housing Association and Helen Duey Hoffman, its Executive Director, have given a

ACKNOWLEDGMENTS

most valuable opportunity to test the occupancy scores through an unofficial study of overcrowding in alley slums of the Capital. To Evelyn Parker of the Association's staff special thanks are due for criticism of the instructions on field and office work.

Several officials named above, plus members of the Committee, made up the consulting panel which constructed and reviewed the penalty scale—a basic job and one of the most arduous.

Specific technical contributions to content of the method have been made by William I. Lourie, one-time student in the Yale University Department of Public Health, who devised the schedule item on daylight obstruction; by George Feldman, member of the New Haven Health Department inspection staff, who made instrumental observations on which scores for daylight obstruction are based; and by A. J. Brandt, sanitary inspector of the Los Angeles Health Department, whose penetrating criticism has helped materially in clarifying field instructions for the deterioration index item.

Typographic design of the schedules, appraisal form and marginal punch card is by Robert Goff. The fact that utilitarian forms, so often muddly and forbidding, have in his hands become clear and relatively simple despite a heavy content is warmly appreciated by the Committee. Mr. Goff has also designed the present volume.

General acknowledgment is due the unknown drafters of schedules and writers of instructions such as those of the U. S. Housing Census and the Real Property Inventory technique. The Committee's staff has been much influenced by their experience and has drawn freely on their materials. Acknowledgment is made of similar background derived from a schedule and rating

scale, less clearly identified as to source, which has been widely used by local housing authorities in tenant selection. That approach is understood to have been first developed by the Management Division of the New York City Housing Authority, under the direction of May Lumsden.

Special tribute is due, for devotion and performance far beyond the bounds of duty, to two persons associated with the Subcommittee.

Andrée Emery served interchangeably, during the developmental period, as Subcommittee member and staff assistant. Part of the early thinking which led to an objective item on structural deterioration was hers, including statistical analysis which showed the validity of surface disrepair as an index of fundamental deterioration. Repeatedly she has helped without stint in supervising office work of developmental surveys, editing field procedures, and similar jobs which make no headlines. More recently, on the staff of the Connecticut State Housing Authority, she has directed a study looking toward adaptation of these procedures for use in rural areas.

Rose Olanik, Assistant Secretary, has given at every stage productiveness, dependability and spirit of the highest order. Many are the drafts of schedules and other forms she has designed with rare skill and taste; many the crises and bottlenecks in the evolution of this manuscript she has prevented by foreseeing them. At critical points in developing the theory of tabulation and analysis her insight has helped to bring order into the scheme, and she has contributed otherwise in many ways to the substance offered by these pages. Without her unfailing strength and resourcefulness this job could hardly have been done.

Appendix A

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Appendix A-1

DETAILED ESTIMATES OF COST AND DURATION

A Procedure for Estimating and Cost Control

Set forth below is a procedure by which the director can make cost estimates sufficiently accurate for budgeting in advance of the consulting period, as discussed in Chapter I, Section 3. While it is usually not essential to make an estimate in such detail prior to the consultant's arrival, it should be made not later than during his visit, as it gives the only sound basis for administrative control during execution of the study. Whenever made, the detailed estimate involves four steps.

First, the conditions of the proposed study are compared with conditions assumed in the normal time allowances for each operation, and necessary local adjustments are made in these allowances.

Second, the number of man-weeks required for field inspection and for all clerical functions—the major operations—is computed for the number of dwelling units to be covered by the study.

Third, the number of man-weeks derived in the previous step is translated into a staff size and duration suitable to the study. Supervisory time and training time are computed in relation to staff size and duration. This third step provides a complete schedule of personnel requirements in man-weeks. It provides also a time schedule for all operations in calendar weeks. It is this time schedule which forms the basis for administrative control during the study. By checking progress periodically in relation to the estimated duration of field and office operations, conformance to the budget can be closely controlled.

Finally, the personnel requirements are translated into dollar costs by applying local rates of pay, and costs for materials are computed in accordance with Appendix A-2. Allowances for consulting service and a contingency reserve complete the total estimated cost.

These four steps are illustrated by specimen calculations for a study of 5,000 dwelling units.

Step 1: Adjusting Personnel Time Allowances to Local Operating Conditions

Before personnel requirements for the several operations can be figured, it must be determined whether

local operating practices will be sufficiently in line with those assumed in the normal time allowances to justify using the standard allowances, or whether these allowances should be adjusted for special conditions of the study.

THE NORMAL TIME ALLOWANCES

Figure A1 lists the seven basic operations in a dwelling survey, shows the personnel involved in each operation, and gives the normal time allowance for each, based on experience in surveys thus far conducted. The personnel requirements of a particular study are calculated from these data, with adjustment if necessary as discussed below.

Operations 1 and 7. Administrative preparation for the study and final preparation of a report carry lump sum time allowances, since the time required for these operations will depend less on the size of the study than on the efficiency and skill of the director. Allowances given in Figure A1 for operations 1 and 7 should suffice for studies up to 5,000 dwelling units or so in the hands of a director with administrative experience and the ability to write a report. These allowances should be increased if the study is much larger than 5,000 dwelling units or if the director is inexperienced. In the former case, the increase required will not be in direct relation to the added size of the study, and decreasing increments can be used for additional thousands of dwelling units.

Operations 3 and 5. The work of inspection and clerical staffs is treated in terms of man-weeks ($5\frac{1}{2}$ day week assumed) per 1,000 dwelling units.¹ Allowance is made for the necessary breaking-in period through slower rates of speed for the first thousand dwelling units. Rates given in Figure A1 for operations 3 and 5 are based on considerable experience in studies to date, and the allowances given should prove adequate under the standard operating conditions assumed. It is these operations, however, comprising the bulk of personnel cost, in which local changes from the standard operating conditions may have the greatest effect on total cost. For

¹ Allowances for field work include field checking at the rate of 10 percent; in other words, 1,100 inspections per 1,000 dwelling units. The consultant can provide further breakdowns of allowances for operations 3 and 5, as a guide to administrative control during execution of the study.

DETAILED ESTIMATES OF COST AND DURATION

this reason both the standard conditions and the effects of varying these are further explained five paragraphs below.

Operation 2. Training of the field staff is allowed for at the rate of one week per inspector, which is ample to cover two days or so of practice enumeration after the training sessions. The total number of man-weeks required will of course depend on the size of field staff, usually determined in Step 3.

Operation 4. The allowance for one field supervisor per eight to ten inspectors has not been tested, for no study conducted with the method to the date of writing has employed a field crew large enough to require a full-time chief inspector. It is probable that a chief inspector or leader of a squad of eight to ten persons could enumerate some schedules in addition to his supervisory duties—or could at least accomplish part of the field checking needed. In either case the charge to operation 4 would be reduced. It also seems likely that in a well-run larger study one full-time field supervisor could handle the work of more than ten inspectors if he were not responsible for field checking.

In a study with a field crew of less than eight inspectors, no separate full-time field supervisor need be provided for, and operation 4 will be represented by some fractional allowance of the time of one of the regular inspectors—and perhaps also by an additional allowance

of one-sixth to one-fifth of the director's time after the period of his full-time supervision in the first weeks of the study (see operation 6).

Operation 6. The director's general supervision of field and office work is shown in Figure A1 to require his full time for four weeks at the beginning of operations 3 and 5, with a fraction of his time thereafter for the duration of these operations. The allowance of four weeks of full time at the outset is necessarily based on the experience of surveys conducted without benefit of the complete procedures in writing, and it may prove needlessly high for future studies which are well organized with competent chief clerks and chief inspectors. Time required for part-time supervision of the director after the breaking-in period will of course depend to a considerable degree on the efficiency of the chief clerk and field supervisor, but one-fourth to one-third of the director's time should ordinarily be ample.

STANDARD CONDITIONS ASSUMED FOR DIRECT FIELD AND OFFICE OPERATIONS

The normal allowances for enumeration and clerical work (operations 3 and 5 of Figure A1) are based on the operating conditions assumed below. If other conditions will apply to the proposed study, the allowances in Figure A1 should be adjusted accordingly before using them as a basis for Step 2.

FIGURE A1. SURVEY OPERATIONS, WITH NORMAL PERSONNEL TIME ALLOWANCES
(Data for Step 1 of Cost Estimate)

OPERATION	PERSONNEL	TIME ALLOWANCE ^a
1. Administrative preparation, consulting period:	Director	3 weeks (minimum) ^b
	Chief Inspector	1 week "
	Chief Clerk	2 weeks "
2. Field training and practice enumeration:	Chief Inspector	1 week
	Inspection staff	1 week per inspector
3. Direct field operations (enumeration and field check): First 1,000 dwelling units Additional thousands, at	Inspection staff	17 man-weeks
		13½ man-weeks
4. Field supervision of operation 3:	Chief Inspector ^c	1 leader per 8-10 inspectors
5. Direct office operations (all phases of survey): First 1,000 dwelling units Additional thousands, at	Clerical staff ^d	17 man-weeks
		13 man-weeks
6. General supervision of operations 3 to 5: Full-time, at outset Part-time, for duration	Director	4 weeks
		Set by duration; see Step 3
7. Interpretation, preparation of report:	Director	4 weeks (minimum)
	Draftsman	3 weeks "
	Stenographer	3 weeks "

^a For assumptions underlying these allowances, see text, Step 1.

^b Allowances marked (minimum) should suffice for surveys up to 5,000 dwelling units; allow decreasing increment for substantially larger studies.

^c Or Squad Leaders.

^d Includes Chief Clerk.

CALCULATION OF INSPECTION AND CLERICAL TIME

Assumption 1: Time requirement for rooming units.

It is assumed in the normal time allowances that: a) rooming units will comprise no more than a small percentage of the total units to be surveyed; or that b) if rooming units are numerous they will be of a type specified below which will not materially affect the time required for enumeration or office operations on the dwelling schedules.

Field and office costs should not be materially affected by small rooming units such as converted single-family houses of not over eight to ten rooms, and a concentration of such units in the survey area can be disregarded in preliminary estimates. If, however, more than 10 percent of medium size or large rooming units (say of ten rooms or over) are anticipated, operations 3 and 5 should be estimated separately for rooming units and family dwelling units, according to the proportion of each anticipated. The standard allowances will of course be used for dwelling units. For medium sized rooming units (say ten to twenty rooms per unit) increase the allowance for operation 3 by 25 to 50 percent; for large commercial rooming units (say twenty rooms or more apiece) increase the allowance for operation 3 by 50 percent to 75 percent. In either case, increase the allowance for operation 5 by one-third of the percent of increase used for operation 3.

Assumption 2: Reporting of legal violations. It is assumed that violations of local ordinances or other official regulations are not to be reported or processed for follow-up action within the time chargeable to this appraisal.

If the customary legal inspection is to be combined with field work of this appraisal, add to the allowance for operation 3 one-third to one-half the time per dwelling unit required for the customary legal inspection. This small allowance should be justified by the fact that many of the observations will be common to both inspections.

If it is intended that the clerical staff of the survey shall receive the inspectors' notices of violation (or similar records of the legal inspection) and shall handle the routing of these to the departments concerned (or take other follow-up action), an additional allowance must be made for operation 5. Requirements here will vary according to the operations required of the clerk; previous local experience with inspection and violation form should be the guide.

Assumption 3: Tabulation from marginal punch cards. It is assumed that tabulation of the findings will be done from marginal punch cards by the clerical staff of the survey under supervision of the director, not from machine punch cards by a separate crew.

If machine tabulation is to be used, reduce the allowance for operation 5 by 50 percent and credit the saving as a reserve to pay the cost of card-punching and tabulation by the machine crew. Final adjustments for this factor will be worked out with the consultant.

Assumption 4: Use of standard and special (local) schedule items. It is assumed that all of the items shown on the standard printed schedules will be used, and that some local items may be added.

The normal time allowances cover field and office operations for the supplementary appraisal item on Daylight Obstruction (S16a) and the supplementary descriptive item on Household Composition and Income (D13a).

If it is proposed to omit either or both of these supplementary items (or any other standard item of the schedules), preliminary estimates should disregard the possible cost savings. These will not be in proportion to the amount of information dropped.

Possible additional costs for added local schedule items may also be disregarded in preliminary estimates: tolerance in the normal allowances will ordinarily cover such added items, and necessary minor adjustments in cost can be determined with the consultant.

In short, the addition or dropping of a few schedule items should be disregarded in considering allowances for operations 3 and 5, and the normal allowances should be used until such time as the details of schedule changes can be discussed with the consultant.

Step 2: Calculation of Inspection and Clerical Time Required

The work of inspectors and clerks (operations 3 and 5) will be the chief item in the total cost. Step 2 consists of figuring the requirements for these types of personnel in terms of the total number of man-weeks required for the given number of units, using the standard or adjusted allowances of Figure A1.² Figure A2 gives these

FIGURE A2. CALCULATION OF INSPECTION
AND CLERICAL TIME REQUIRED
(Step 2 of Cost Estimate)

Specimen Survey: 5,000 Dwelling Units	
OPERATION	MAN-WEEKS
3. Direct field operations (enumeration and field check):	
Inspection staff	
First thousand DU @ 17 man-weeks	17
Four additional thousands @ 13½ man-weeks	54
Total time of inspectors	71
5. Direct office operations (all phases):	
Clerical staff	
First thousand DU @ 17 man-weeks	17
Four additional thousands @ 13 man-weeks	52
Total time of clerks	69

² It is assumed that the number of units to be surveyed has been determined in the light of factors set forth in Chapter I, and that determination of the size of survey is not strictly part of the cost estimating process. It is recognized, however, that results of the cost estimate may reopen the question as to whether more or fewer units might be treated in the study.

DETAILED ESTIMATES OF COST AND DURATION

TIME SCHEDULE OF OPERATIONS, WITH PERSONNEL REQUIREMENTS IN MAN-WEEKS:

SHEET COST ESTIMATE: STEP 3: SCHEME A

Scheme A: 5,000 dwelling units, five months duration

STUDY 1946 BLANKVILLE HOUSING SURVEY

Readings _____ Entries _____ Date _____

OPERATION, PERSONNEL	PERSONNEL REQUIREMENT: Man-weeks ^a						TIME SCHEDULE: 22 Calendar Weeks Duration, (With Number of Persons Assigned Each Week)																					
	Director	Chief Inspector	Insp Staff	Cler Staff	Draftsman	Steno	April			May			June			July				August								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22						
	d	c	m	d	c	m	d	c	m	d	c	m	d	c	m	d	c	m	d	c	m							
1. Administrative Prep: Director	3	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
Chief	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
" " Inspector	-	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
Chief	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
" " Clerk	-	-	-	2	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
Chief	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
2. Field Training: Inspector	-	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
Inspector	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
" " Staff	-	-	8 ^b	-	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
Inspector	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
3. Field Operations: Staff	-	-	7	1	-	-	8	8	8	8	8	8	7	-	-	-	-	-	-	-	-	-						
Chief	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
4. Field Supervision: Inspector	-	9 ^c	-	-	-	-	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-						
Clerical	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
5. Office Operations: Staff	-	-	-	6	9	-	2	4	4	6	6	6	6	6	6	4	4	3	-	-	-	-						
Director	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
6. General Supervision: Full-time	4	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1						
Director	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
" " Part-time	3 ^d	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
7. Interpretation, Report: Director	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
Draftsman	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
" " man	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1						
Steno-grapher	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
TOTAL PERSONNEL REQUIREMENT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
(Man-weeks)	14	11	79	71	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						

^aRequirements based on Steps 1 and 2 except as noted. ^bBased on maximum number of inspectors for Operation 3. ^cBased on duration of Operation 3. ^dBased on duration of Operations 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22. Tabular Form DS-6: 1944, Committee on Hygiene of Housing, APHA

FIGURE A3. TIME SCHEDULE, WITH PERSONNEL REQUIREMENTS IN MAN-WEEKS
(Step 3 of Cost Estimate)

Specimen Survey: 5,000 Dwelling Units; Scheme A, 5 Months Duration

calculations for a hypothetical survey of 5,000 dwelling units, in which the standard operating conditions are assumed. The requirements are found to be 71 man-weeks of inspection time and 69 man-weeks of clerical time. A similar calculation would be made in terms of the local study, using different allowances if the operating conditions are to vary from the standard basis as discussed under Step 1 above.

Step 3: Scheduling Duration, Size of Staff and Supervisory Time

Knowing from Step 2 the number of man-weeks of inspection and clerical time required, the director can determine in Step 3 how large a staff is needed to accomplish the work in a specified period—or conversely how long a staff of specified size will require to accomplish

the task. Only when staff size and the duration of field and office work have thus been reconciled can overhead costs for training and supervision be determined.

Step 3 expresses the personnel requirements for all operations, both in terms of the total man-weeks required and as a calendar time schedule. The method of doing this is shown in Figure A3.³

ORGANIZATION OF THE TIME SCHEDULE

The operations and types of personnel involved comprise the stub of Figure A3. The six left-hand columns are reserved for showing the man-weeks required for each type of personnel. The remaining columns are

³As indicated in the example, the calculations of Step 3 can conveniently be recorded on the standard Tabular Form, described in Chapter V. Copies of the form can be had for this purpose in advance of the consulting period, on request to the Committee on the Hygiene of Housing.

SCHEDULING DURATION AND SIZE OF STAFF

used to express the calendar weeks of duration, two weeks being carried in a column.⁴ Entries in these columns show the number of persons to be assigned to each operation each week.

DURATION OF THE MAJOR PHASES

For the hypothetical study of 5,000 dwelling units a total duration of five months will be taken as desirable. Time is first reserved at beginning and end of this period for preparatory and final operations, and the remainder is allotted to direct field and office operations.

Reference to Figure A1 (Step 1) shows three weeks as a proper allowance for administrative preparation (operation 1), and three weeks at the beginning of the study are blocked out for this purpose. The director is shown full time during these three weeks, by entry of the figure 1 under Time Schedule, below the numerals for weeks 1, 2, 3.

The second and third weeks of administrative preparation are assumed to be the consulting period. The chief clerk is therefore scheduled to be available full time for training during weeks 2 and 3. The chief inspector is scheduled full time for week 2; during week 3 he will be engaged with other inspectors in field training (operation 2).

Turning now to operation 7, Figure A1 indicates that a month or so at the end of the study should be reserved for interpretation of the tables and charts and for preparation of a report. All other operations should have been finished before this stage. Although the five month period includes 22 weeks, all work will be scheduled for completion by week 21, to allow a cushion for last minute pressures and delays. Operation 7 is therefore shown in full swing during weeks 18-21, with time scheduled for the director, a draftsman and a stenographer.

Fourteen calendar weeks (weeks 4 to 17 inclusive) are therefore available for direct field and office operations, and a staff is to be planned which can do the work in this period.

SIZE OF INSPECTION AND CLERICAL STAFFS

The basis of this determination is the figures produced by Step 2: for the hypothetical study, 71 man-weeks of inspectors' time and 69 man-weeks of clerical time. These figures are recorded on the Tabular Form for Step 3, as shown in the example opposite operations 3 and 5 under Personnel Requirement.

In the example, field operations have been scheduled for completion five weeks earlier than office operations. This is good practice in that it permits a smaller clerical staff than field staff and minimizes the problems of office space and office supervision during the overlapping stages of processing and analysis. Taking nine calendar

⁴ If additional columns are needed to cover a study of longer duration than that illustrated, these can be provided by stapling a second Tabular Form at the right of the first.

weeks as the duration of field work, the 71 man-weeks needed for these operations are found to require a staff of eight inspectors, tapering off to seven at the close. This is recorded by entering the figure 8 under each of the weeks 4-11, and the figure 7 for week 12.⁵

Distribution of the 69 man-weeks required for clerical work (operation 5) over the fourteen weeks assigned for this will require a maximum staff of six clerks. It is necessary to build such a clerical staff to its peak size from a smaller number at the outset, as illustrated in Figure A3, because full-scale processing and tabulation cannot be undertaken until a substantial group of schedules has been returned from the field.

SUPERVISORY AND TRAINING TIME

The determinations above have fixed the size of staff and the duration of field and office work, which in turn determine the man-week requirements for field training (operation 2) and the period of field and general supervision (operations 4 and 6).

One week of field training for each of the eight inspectors accounts for the figures 8 opposite operation 2 (once under Personnel Requirement: Inspection Staff; once under Time Schedule: Week 3).

The inspection staff of eight is shown by Figure A1 to justify one full-time supervisor, and the nine-week duration of field work establishes the nine man-weeks requirement for operation 4.⁶ The chief inspector is also carried at one man-week for field training (operation 2, week 3).

The director is scheduled full-time in general supervision of field and office work (operation 6) for four weeks at the start of field and office operations (weeks 4-7), as specified in Figure A1. Thereafter this supervision should require only a fraction of his time, and it is so shown in the example.

TOTAL PERSONNEL REQUIREMENTS

The figures under Time Schedule, showing the number of persons at work on each operation during each week, are totalled across the sheet to the left under Personnel Requirement. The Total Personnel Requirement for each type of personnel is then entered in man-weeks at the bottom of the sheet. These figures, when multiplied by the rate of pay for each type of worker, give the personnel costs, to be presented in Step 4.⁷

⁵ An optional scheme, allowing for casualties as suggested in Chapter I, would be to schedule a crew of ten inspectors, nominally for seven weeks. One or two drop-outs could thus be absorbed without exceeding the nine weeks available for field work, and the need for training replacements would be avoided.

⁶ Supervisory duties of the chief clerk are included in the basic allowance for operation 5, and need not be separately posted as in the case of field supervision by the chief inspector.

⁷ No distinction is made in Step 3 between the chief clerk and other clerks, though it is recognized that the former should usually appear at a higher salary in the cost figures of Step 4. Salary computations will be based on the premise that the chief clerk will be the first hired and the last released. Thus in the example the

DETAILED ESTIMATES OF COST AND DURATION

ALTERNATIVE TIME SCHEDULES

It may be desirable to make two or three schemes of Step 3, allowing different durations to determine which is most economical in cost of supervision or will best utilize the number of clerks and inspectors available.

As noted in Chapter I, a large staff and minimum duration will be desirable if the director's full time is to be charged to the survey throughout the study rather than pro-rated on a part-time basis during the middle period, as assumed in the example. The same may tend to be true if office rent constitutes a significant charge against the study.

Step 4: Estimate of Total Cost

This final step brings together personnel and other costs in summary form for review by sponsors of the study, as shown in Figure A4.

PERSONNEL COST

Total personnel requirements derived in Step 3 are translated into dollar cost by applying the local rates of pay for each position.

GENERAL COST: MATERIALS

These items are computed from data given in Appendix A-2, and are presented as shown in the example.

GENERAL COST: CONSULTING SERVICE

Cost of consulting service will be based on an estimate developed through correspondence with the Committee on the Hygiene of Housing. This figure will cover round-trip travel expense from New Haven, the consultant's subsistence in the locality, and a per diem or lump sum fee for the consultant's services.

CONTINGENCY RESERVE

In all cases where a detailed estimate is prepared by the director in advance of the consultant's visit, a substantial contingency allowance should be included, to chief clerk would be continuously on duty from week 2 (operation 1) through week 17, serving for a total of 16 weeks. Therefore the 71 man-weeks of clerical time in the example represents 16 weeks at the chief clerk's salary rate and 55 weeks at the lower rate of other clerks.

cover the possibility that local factors increasing cost may have been overlooked. In no such case should the contingency allowance be less than 10 percent of the combined personnel and general cost (see Figure A4);

FIGURE A4. ESTIMATE OF TOTAL COST OF DWELLING SURVEY

(Step 4 of Cost Estimate)

*Specimen Survey: 5,000 Dwelling Units,
5 Months Duration*

<i>Personnel Cost</i>					\$7210
Director (1)	14	man-weeks	@ \$75	\$1050	
Chief Inspector (1)	11	"	"	45	495
Inspectors (8)	79	"	"	35	2765
Clerical Staff	71	"	"		
Chief Clerk (1)	16	"	"	45	720
Clerks (5)	55	"	"	35	1925
Draftsman (1)	3	"	"	50	150
Stenographer (1)	3	"	"	35	105
<i>General Cost</i>					1390
Office space, furniture and standard equipment (contributed)					\$ —
Stationery supplies, blueprinting, sundries					150
Field equipment for inspectors: 10 @ \$6 each					60
Printed forms: 6000 DU @ \$50 per thousand ^a					300
Special equipment: rental 4 months @ \$20 ^b					80
Consulting service by Committee on the Hygiene of Housing ^c					800
<i>Total Cost</i>					
Sum of Personnel and General Cost					8600
Contingency Reserve: 10% approximately					900
TOTAL, excluding publication of report					\$9500

^a Field schedules, appraisal forms, punch cards, tabular forms: includes 20% allowance for training, field check and waste.

^b Punch card scaling device (Percentor) and scoring templates.

^c Cost of this item would be determined in correspondence with the Committee; see text, Step 4.

and it can better be carried at 15 to 20 percent of this cost pending review by the consultant. Little if any of this contingency allowance should be needed unless local conditions are quite unfavorable to efficient work, or unless the director has overlooked material given in this manual, but it is better to overestimate than underestimate the cost in the beginning.

Appendix A-2

MATERIALS REQUIRED

Supplies and equipment needed for all phases of the dwelling appraisal are listed below for cost estimating and as a checklist for procurement. For standard materials available from a stationer or other commercial source, prices should be determined locally, but for items to be procured from the Committee on the Hygiene of Housing or other outside source an indication of cost is given.

To conserve time during the consulting period, a number of the items, as specified below, should be obtained before the consultant's arrival.

For detailed cost estimates prior to the consulting period the cost of each item should be calculated in accordance with the size of study contemplated.

1. Office Furniture and Standard Office Equipment

Requirements as to desks, file cases, typewriter, adding or calculating machine, etc., are given in Chapter I, Section 4 of this volume. Arrangements for these should be made insofar as possible before the consulting period.

2. Stationery Supplies

Items under this heading will be procured from a local stationer or other commercial source, or through the purchasing or supply department of a sponsoring agency. At least a partial supply of each item in this group should be obtained before the consultant's arrival, to permit establishment of files and other administrative machinery early in the consulting period.

1) *File folders.* Letter size, 3-position tab folders are used for filing the dwelling schedules in all stages of the work. It is necessary to have one folder for each block covered by the survey, plus a supply for general administrative purposes. About eight folders will be needed for the field equipment of each enumerator, as listed under heading 3, below. In a sampling survey, folders may also be needed to file the block maps or lists used as a sampling source. A single folder may carry the sampling data for a number of blocks.

2) *File guides (dividers).* These should be $9\frac{1}{2} \times 11\frac{1}{2}$ inches, with 3-position tabs, of heavy pressboard. They

are used in the schedule files to indicate the various stages of work, as detailed in Appendix C-1, Files and Administrative Controls. About two dozen of these will be needed as a basic supply.

3) *File labels.* Tabs of file folders and file guides can be quickly and neatly labelled by typewriter, using gummed perforated labels commercially available in rolls or strips. If sampling data are being filed, it may be convenient to identify the folders for these with salmon, buff or other light-colored labels, using white for the block folders of dwelling schedules.

4) *Mounting board and paste.* Reference tables, maps and other materials will need to be mounted for convenient handling. Any heavy cardboard, matboard or a light weight bookbinder's board will serve. Three or four sheets up to 20 x 30 inches or so will probably be needed as an initial supply.

A pint or more of Higgins Vegetable Glue, a high grade waterproof adhesive, will be useful for various mounting purposes, as will a 1 or $1\frac{1}{2}$ inch brush for applying it.

5) *Carbon paper.* This is used in scoring, to complete the written entries on the marginal punch card at the same time as those on the Unit Appraisal Form. Sheets $8\frac{1}{2} \times 11$ inches are cut to $4\frac{1}{4} \times 11$ inches to fit the punch card, and each half sheet of carbon will serve for 8 to 10 dwelling units. A hard typewriter carbon is preferable to pencil carbon, which smudges.

Carbon paper is not necessary if machine punch cards are used.

6) *Ringbooks.* A standard $11 \times 8\frac{1}{2}$ inch three-ring binder will be needed for filing the sheets of the Dwelling Serial List. A ringbook $8\frac{1}{2} \times 11$ inches (three rings on the $8\frac{1}{2}$ inch side, with rings $2\frac{3}{4}$ inches apart) will be required for filing work tables and charts prepared on the standard Tabular Form. A dozen or so divider or index sheets for each type of ringbook will be a convenience.

An additional ringbook $8\frac{1}{2} \times 11$ inches may be desired for filing Progress Control Tables and other administrative records to be prepared on the Tabular Form. All ringbooks should have rings of at least 1 inch diameter.

7) *Sundries.* Medium black pencils will be used by

MATERIALS REQUIRED

field and office staffs, and clerks will need a few red pencils. A pencil sharpener, scratch pads, paper clips and erasers should be provided.

A ream of cheap yellow copy paper, 8½ x 11 inches, will be wanted for File Dummy Sheets, as described in Appendix C-1.

A stapler may be desired at the end of the processing phase, for attaching appraisal forms to Unit Schedules before final filing.

3. Field Equipment for Inspectors

Each field worker will require one set of the following materials, obtained from local sources, except in the case of item 10.

At least two sets should be procured before the consultant's arrival, and the remainder will be needed for the training sessions of the field staff.

8) *Clipboard*. This is used as a writing surface in enumeration of schedules. The ideal clipboard is one of metal (aluminum or japanned steel) about 9 x 15 inches, with a spring-hinge cover to protect schedules from wind and rain.⁸ The ordinary clipboard of tempered masonite, plywood or hardwood—approximately 9 x 14 inches with spring clip at the end—is satisfactory, however.

If the back of the Structure Schedule is to be used for recording legal violations (see Chapter III, Section 3, and Figure 8) the clipboard must be large enough to carry the Structure Schedule unfolded to its full 11 x 17 inches size. In this case it may be necessary to have special clipboards made, from tempered masonite or waterproof plywood, attaching spring clips available from a commercial stationer. In this case the clipboard should be about 12 x 20 inches, with the clip attached to the 12-inch end and leaving about 18 inches of clear surface beyond the edge of the clip.

9) *Manila expanding envelope*. A heavy red manila or so-called leatheroid envelope, not less than 9 x 14 inches, will be attached to the back of each clipboard.⁹ This will permit carrying a supply of blank schedules, completed schedules and the inspector's copy of the Field Procedures in convenient form, protected from the weather. The envelope should have expanding bellows at the sides and bottom, with a generous cover flap at the top. Right-handed enumerators will find it a convenience to have this envelope mounted with the open side at the left of the clipboard when the clipboard is held face upwards in its normal position. In this way the left hand, holding the clipboard, prevents materials in the envelope from sliding out. The envelope can be cemented to the back of a wood or masonite clipboard

with Higgins Vegetable Glue. The same glue can be used on metal clipboards if these are roughened with coarse emery paper or sandpaper to give bite to the surface, though a special metal cement may be preferable. Mounting of the envelope may be deferred for advice by the consultant.

10) *Enumerator's instructions*. The Field Procedures should be ordered from the Committee on the Hygiene of Housing: one copy for each field worker. A spare copy or two for office use may be desirable. The price is \$1.00 per copy, postpaid, and delivery will be from stock without delay.¹⁰

11) *File folders*. A set of file folders carrying the labels given below should be provided for use inside the envelope described in item 9 above. It may be necessary to cut down the tabs on these file folders before labelling them, in order to permit the cover of the envelope to close, or a special supply of flush tab folders may be obtained to provide for this item.

Structure Schedules (Blank)
Dwelling Unit Schedules (Blank)
Rooming Unit Schedules (Blank)
Dummy Sheets
Recall or Pending Completion
Completed Schedules
Field Procedures

12) *Clipboard reference data*. For each inspector a copy of the Classification Table for the Deterioration Index (Appendix B, Figure B12) should be photostatted, ready for mounting on the clipboard with the consultant's advice.

Negative photostats are preferable to positives, and they should be made the same size as the original copy, or enlarged if the size of the clipboard will permit.

If schedule item S16a on Daylight Obstruction is to be enumerated, a triangle of the size specified below¹¹ will be outlined on the clipboard. The means of doing so will depend on the type of clipboard, and this item can be handled during the consulting period.

13) *Rule or spring steel tape*. A 6-foot folding carpenter's rule or 6-foot spring steel tape of good quality will be needed to measure dimensions of small rooms. This is carried in the inspector's pocket (or, if a woman, in her handbag).

14) *Pocket flashlight*. This is desirable for inspection of basements or dark public halls.

15) *Pocket notebook*. It may be desirable to supply small pocket notebooks in which inspectors can record

¹⁰ Orders through the Committee on the Hygiene of Housing should be addressed to 310 Cedar Street, New Haven 11, Connecticut. Materials so ordered may be shipped from the New York office of the American Public Health Association.

¹¹ Specification: 18° right triangle, with right angle forming base and right leg; may be constructed in following proportions: base 8½ inches, leg 2¾ inches. To be mounted with base parallel to bottom edge of clipboard.

⁸ An example of this type is the National No. 7868.

⁹ An example is the type manufactured by the Cooke & Cobb Co., called the "Favorite." The stock number is 20-2, size 9 x 14 inches.

SCHEDULES, SCORING TEMPLATES AND TABULAR FORM

questions to be clarified in the office or for other records as determined by the director.

16) *Maps.* Routing maps as described in Chapter III, Section 4 (Issuance and Routing) are an optional item. Block maps used for sampling could be issued to enumerators, or a street guide and map commercially available for the city may be supplied.

17) *Pocket or wrist watch.* A watch, provided by the enumerator, should be carried if records are to be kept as to the time required for inspections.

4. Schedules, Scoring Templates and Tabular Form

Dwelling schedules will usually be printed locally by the photo-offset process. The scoring templates and pads of the Tabular Form are supplied by the Committee on the Hygiene of Housing.

For items in this group no preparation need be made in advance of the consulting period except where advance detailed cost estimates are needed. In this case a local printer should estimate the cost of schedules required, taking account of the points noted in items 18a to 18d, below.

18a) *Dwelling schedules: general.* The schedules (shown in Figures 5-7) can be printed either by the conventional letterpress method or by photo-offset lithography. The former is usually more expensive, and the offset method is the only one which can be used where local items are added to the schedules. Letterpress reproduction can best be done in New Haven, from electrotypes of the Committee. Offset copies can be made in most cities by a local offset or lithoprinting firm. Glossy reproduction proofs for this purpose will be supplied by the consultant, and local schedule items can be added to these proofs by typewriter and ruling pen before reproduction.

A clear white sulphite paper stock weighing 16 to 20 pounds per ream of sheet size 17 x 22 inches should be used for printing, except for the Rooming Unit Schedule, which takes a colored stock, as explained below.

The quantity of schedules needed, and the ratio between Structure and Unit Schedules, can usually be figured approximately from the columns of the 1940 Housing Census bulletins which show total numbers of dwelling units and structures. The Census includes rooming units in the count of dwelling units. If rooming units are known to occur, the proportion of Dwelling Unit and Rooming Unit Schedules to be ordered will probably have to be a guess unless local sponsors have accurate knowledge of the number of rooming units through license data or other special sources. Beyond the actual number of units and structures to be surveyed, allowances should be made both for Unit and Structure Schedules, as follows:

Field checking: Approximately 10 percent in addition to net number of units and structures.

Training supply and waste: At least 300 copies each of Structure and Dwelling Unit Schedules, or in a large study from 5 to 8 percent of the net number of structures and units. Smaller reserve supplies of the Rooming Unit Schedule may suffice if this type of unit is a minority of the cases to be studied.

An additional reserve supply may be needed if the Census or other count of dwellings is considered out of date or otherwise inaccurate.

A local printer should include in his estimate the cost of supplying the heading imprint (identifying the city and giving the title of study) in 8 point bold Baskerville or closely similar type.

Prices will vary according to method of reproduction, paper stock used, and the ratio of Unit Schedules to Structure Schedules. With a ratio of 2 to 3 dwelling units per structure (which has been found characteristic of many slum areas) and a good paper stock, cost of all schedules might run from \$15 to \$20 per thousand dwelling units in a study of 2,000 units or less, reducing to \$10 or \$12 per thousand units in a study as large as 10,000 units. Such a figure should cover the Structure Schedules needed as well as the Dwelling Unit Schedules. Costs will increase in a single-family house district, where one Structure Schedule is required for each Unit Schedule, or in a rooming house district, where both Dwelling Unit and Rooming Unit Schedules must be printed. Costs will drop where the average number of units per structure is three or more.

18b) *Structure Schedule (Form DS-1).* This should always be printed at the left side of 11 x 17 inch sheets, which are folded to 8½ x 11 inches with the fold at the right of the schedule. This is done even if the legal violations form or similar copy is not used and the right half of the sheet is left blank. The reason for this is to provide a folder for filing the Unit Schedules in each structure. Handling of schedules without this feature is most unsatisfactory, and the paper saved would be a false economy.¹²

18c) *Dwelling Unit Schedule (Form DS-2).* This is printed on 8½ x 11 inch sheets. Specifications for exact placement of this and other schedules on the sheet, so as to align in the scoring template, will be supplied by the consultant.

18d) *Rooming Unit Schedule (Form DS-3).* This is always to be printed on 8½ x 11 inch sheets of a light colored stock: yellow, buff or any color which will give good contrast with pencil figures. This is done as a reminder to the scoring operator at the template that certain special operations for a rooming unit are to be performed.

¹² The legal violations form, shown in Figure 8, is optional matter which may be printed on the right half of the Structure Schedule. If schedules are to be printed locally, reproduction proofs of this form will be supplied by the consultant. Other copy serving the same purpose and locally prepared can also be used. Inclusion of this form should have a negligible effect on cost of schedules.

If it is not known before the survey how many Rooming Unit Schedules will be needed, a small initial supply of these can be furnished at cost from stock of the Committee. In this case, the schedule heading will carry no locality imprint, and the name of city and title of the study should be imprinted locally, perhaps with a rubber stamp.

19) *Scoring templates.* The Structure and Unit Scoring Templates, shown in Appendix C-3, Figures C22 and C23, comprise the equipment for scoring. One pair of templates should be sufficient for studies using up to five or six clerks.

Templates can be obtained from the Committee either in the form of substantial finished fixtures, ready to use or (at the cost of photostats only) in the form of sheets to be mounted by the local staff. The latter is not recommended except for a very small study or one with access to a resourceful carpenter or woodworking shop.

The standard templates are negative photographic copies on sheet aluminum or zinc, with windows cut through the metal.¹³ Mounting arrangements include a solid base and adjustments for convenience of the operator.

For a study of limited duration, templates may be rented from the Committee at a cost of \$5.00 per month plus transportation charges to and from New Haven. Shipping weight of a pair of templates will be about 60 pounds. Where an indefinitely continuing study is contemplated, it will be cheaper to buy a set of templates, at a cost of \$40 to \$50, depending on the metal and other materials available for template construction at the time of the order.

Two to three weeks should be allowed for delivery of this item from New Haven.

20) *Tabular Form (Form DS-6).* This 8½ x 11 inch form, illustrated in Figure 16, is supplied in pads of 100 sheets, from stock of the Committee. It is end-punched with three holes for binding in an 8½ x 11 inch ringbook as specified above.

Two or three pads, sufficient as an initial supply for any study, will be supplied by the consultant, and additional pads can be supplied by mail as needed, without delay. Price is expected to be fifty to seventy-five cents per pad, depending upon the volume of printing justified by the demand.

5. Appraisal Forms, Punch Cards and Punch Card Equipment

Items in this group include the supplies for scoring, and the equipment needed to process marginal punch cards. Where machine tabulation is to be used the only material required from this group is item 21, Option B.

¹³ The size of the structure template is about 15 x 22 inches; of the unit template about 15 x 28 inches. The unit template carries on its left side a scoring table for appraisal items 16-19 and 26-29, which cannot be reproduced legibly at the page size of this manual.

If marginal punch cards are employed, all materials in this group will be supplied by the McBee Company, Athens, Ohio, manufacturers of the punch cards, through their local or district representative. In either case, arrangements can be deferred until the consulting period.

21, *Option A) Unit Appraisal Form and marginal punch card (Forms DS-4 and DS-5).* Where the marginal punch card is used, it is supplied with the Unit Appraisal Form, the two forms being padded together in sets to permit carbon entries on the punch card at the time of scoring the appraisal form. These two forms are illustrated in Figures 9 and 11.

Estimates for these forms should allow one set or pair (appraisal form plus punch card) for each dwelling or rooming unit to be surveyed, with an allowance for training and waste of 200 to 300 sets for a small study and 5 to 8 percent of the number of units in a study of more than 5,000 units.¹⁴ Current prices of the McBee Company, subject to change, are as follows:

\$35.60	per thousand sets for orders of	2½ thousand sets
\$28.10	" " " " " " 5	" "
\$24.35	" " " " " " 10	" "
\$20.40	" " " " " " 25	" "

Shipping charges from Athens, Ohio (weight about 25 pounds per thousand sets) will be added to these costs.

Normally about 30 days are required to print an order of these forms, but at the time of writing 90 to 100 days are required between receipt of an order and shipment from the factory. So long as this condition (due to war-time restrictions and shortages) obtains, the Committee will endeavor to maintain a stock from which initial needs of a survey can be supplied so as to avoid unreasonable delay.

Surveys covering fewer than 2,500 dwelling units can also be supplied from this stock.

Appraisal forms and punch cards supplied from the Committee's stock will be at the rate of \$30 per thousand sets, plus transportation charges from New York. Such forms will not carry a heading imprint to identify the survey, and this should be supplied locally by means of a rubber stamp.

Current prices of these forms are about \$10 per thousand higher than was allowed in the lump sum figures of Appendix 1 of Part I. Costs for schedules, appraisal forms and punch cards will probably run closer to \$50 per thousand units in small studies than to the \$40 suggested in Part I.

21, *Option B) Unit Appraisal Form (Form DS-4) and machine punch card.* Where tabulating machines are to be used, standard 80 column Hollerith type cards will be locally procured, and these will be independent of the Unit Appraisal Form. The number of cards required will be based on the number of units in the study.

¹⁴ The count of structures does not affect the number of appraisal forms and punch cards required, as these forms carry for each unit the characteristics of the containing structure.

The appraisal form can be reproduced locally by offset printing, from copy supplied by the consultant. Price and delivery schedules for appraisal forms and punch cards will be determined locally. In this case the printer will wish to know that the appraisal form is 5 x 11 inches, printed on white stock similar to that used for dwelling schedules.

22) *Punch card scaling device (Percentor)*. This instrument, illustrated only in principle by Figures 14 and 15, is being designed for commercial manufacture by the McBee Company. It is expected to be in production by the time of publication of this manual. It will be rented, and the charge is expected to be not over \$10 to \$12 per month.

Should the final commercial model not be available by the time of publication, a satisfactory temporary wooden model can be made by a local woodworking shop—or in New Haven—at a cost which should not exceed \$25 to \$30.

23) *Card punch*. In a survey of not over 2,000 to 3,000 units, cards can be punched with hand punches, similar to a ticket punch, but the power operated keyboard punch will be economical in larger operations. Hand punches are sold at \$1.50 each, and two or three will be desirable for a study using up to four or six clerks. Even with the power punch, one supplementary hand punch is usually desirable.

The power punch is rented at \$10 per month, and in a large study its greater speed should more than save its cost. Cost of transportation (shipping weight about 200 pounds) from Athens, Ohio and return would be added to the rental charge for the power punch.

24) *Tumblers (sorting needles)*. These resemble long knitting needles with a handle, and are sold for \$.75 each. Three or four may be desirable, and at least two will be wanted even for a small study. For large studies one tumbler might be ordered for each two clerks.

25) *Correction pasters*. These are gummed paper strips for restoring the edge of a card incorrectly punched. They are supplied in small books at \$.25 each. One book per thousand punch cards should be an ample allowance.

26) *Punch card file cases*. The most convenient means of filing marginal punch cards is a wooden case about 7 x 12 inches by 18 to 24 inches. The consultant will supply sketches from which a local woodworking shop should be able to make these for \$3 or \$4 apiece. A case 24 inches long will accommodate 1,500 to 2,000 cards, depending on the number of dividers used for districts, areas or other subdivisions. Provision is made in the design of these cases for nesting one above another.

Marginal punch cards, which are 5 x 11 inches in size, may be filed in standard letter files, though with less convenience and some waste of space. In this case, one file drawer should be provided for each 1,500 to 1,800 punch cards (dwelling or rooming units), in addition to

the schedule file drawers specified in Chapter I, Section 4 of this volume.

27) *Punch card dividers*. In analysis with marginal punch cards, dividers or guides will be convenient for separating cards of districts, appraisal areas or other classifications. These dividers can be made of heavy cardboard or light bookbinder's board. The quantity needed will depend on the size of the study and on details of the plan of tabulation, but an allowance of \$5 to \$7 for materials and labor should suffice for estimating purposes. The consultant will supply sketches for making these dividers, and will advise as to the quantity required.

6. Administrative Controls and Office Reference Data

No arrangements need be made prior to the consulting period for items 28 and 29, except to make sure that necessary mimeographing and photostatting can be done. Item 30, however, might well be procured in advance of the consultant's arrival.

28) *General materials*. Arrangements will be made during the consulting period for items in this group, which comprise the materials given in Figures C1-C15 of Appendix C. Figures C3 and C8 will ordinarily be mimeographed.¹⁵ Figures C4-C7 will be retyped on copies of the Tabular Form, with local changes as needed. Figures C9-C15 can best be copied by photostat. Changes may be made locally in Figures C13-C15.

29) *Sampling form*. In a sampling survey, mimeographed 8½ x 11 inch forms may be needed if sampling is not done from maps. In this case appropriate copy will be supplied by the consultant, and one sheet will be needed for each 40 to 50 structures in the survey area (total number of structures, not the net number of structures in the sample).

30) *General reference map*. A map or maps showing all survey districts at the scale of 1 inch = 400 ft. or 1 inch = 800 ft. will be wanted to show district and block numbers and for general reference purposes. If the environmental appraisal is being made, this map may be the same as that used for the district base maps of the environmental survey. The map should give the names of at least the principal streets, and it is desirable to show all wholly nonresidential blocks (parks, institutions and business or industry) by appropriate legends.

The map should be mounted on the board specified in item 4 above for hanging and easy handling. If it is pasted to the mounting board, a duplicate map or sheet of paper of similar weight should be pasted to the back of the board to prevent excessive curling.

¹⁵ The File Dummy Sheet, Figure C3, will be mimeographed on the yellow sheets specified in item 7, above. The Dwelling Serial List, Figure C8, will be mimeographed on 8½ x 11 inch sheets, with one sheet for each 20 to 25 dwelling structures included in the survey.

Appendix A-3

A NOTE ON SAMPLING

METHOD

Sampling procedures will vary with the source of information and the ratio of dwellings to be sampled; no uniform instructions can be given which will permit selection of the sample in advance of the consulting period. It may be noted, however, that structures are usually classified by physical type (number of units in the structure) and that the specified proportion of dwelling units is drawn at random from each type, usually by reference to Tippet's random sampling numbers.

SOURCE OF DATA

If the complete environmental appraisal is being made, sampling data can be best obtained from the Land Use Schedules of that study, and the director should arrange to have these schedules completed for each area before enumeration of dwelling schedules.

In other cases, the best source is usually a large-scale map showing each structure and its address. If the city engineer has up-to-date maps of this sort (usually at a scale of 50 feet or 100 feet to the inch) a set of black and white ozalid prints should be obtained for the survey areas. A duplicate set of prints may earn its cost by time saved in issuing assignments and routing inspectors.

If there is no such map of which prints can be obtained for use in the survey office, sampling can perhaps be done from the Sanborn insurance atlas or other

series of maps showing all structures and their addresses.

In the absence of any suitable large-scale map, sampling can sometimes be done from lists of properties such as are maintained by an assessor's office, if such lists show clearly the address and number of dwelling units for each structure. Some such lists, however, have been found so inaccurate as to cause great confusion when assignments of sample dwellings are carried into the field. It is therefore not recommended that lists of this type be used unless there is conclusive evidence that they are up-to-date and accurate.

PREPARATION

Local sources of sampling data should be examined by the director before the consulting period.

The over-all time allowances for clerical staff should normally cover selection of sample dwellings, but this task alone may require a full-time clerk for a short period at the beginning of the study. Arrangements should be made for a clerk (in addition to the chief clerk) who can begin sampling within a few days after the consultant's arrival.

In a small study the task of sampling may justify scheduling a second clerk from the beginning of data collection, or it may mean withholding an inspector temporarily from the field. It should never be permitted to interfere with the chief clerk's duties in receiving and checking enumerated schedules during field work.

Appendix A-4

CHECKLIST FOR EDITING LOCAL SCHEDULE ITEMS

1. *Definitions:* Are all terms appearing in the schedule item or in the field instructions defined as necessary?
2. *Agreement between schedule and instructions:* Are headings or captions of the instructions complete? Does their wording agree with that on the schedule?
3. *Application of item:* Is it clear what the item covers? For example, does it apply to facilities or conditions within the unit only, or to facilities outside of but available to the unit?
4. *Source of information:* Is it clear whether the item is to be completed by observation or by inquiry?
5. *Entry to be made:* Is the type of entry specified for the item or for its subitems? If the entry is other than the standard X, is it covered by a supplement to the processing instructions (Appendix C-3)?
6. *Facility not present:* Is it necessary to specify an entry for cases where the facility covered by the item does not exist—as in the case of the standard schedule items (S11, S12) for public halls and stairs?
7. *Information not obtainable:* Are instructions necessary for cases where information or access is refused?
8. *Occurrence in manner other than assumed in schedule:* Can the facility or condition occur in a different way or place, or with a different number of cases, than is provided for in the schedule or than is ordinarily expected? If so, do the instructions cover a reasonable entry? Will the item still make sense?
 - a) Can there be more cases than the schedule provides for?
 - b) Can the facility or condition occur in a different location than is assumed?
 - c) Can the facility be of a different type, size or construction than assumed?
 - d) If the item reports a condition, is it indicated whether the condition must be present at the time of inspection or whether it may be reported if there is evidence that the condition is chronically present?
9. *Interrelated items:* Does the item relate to another schedule item? If so, have instructions for the two been reconciled?
10. *Clarity of instructions:* Are the instructions given as simply and briefly as possible, and are the essential points stressed?